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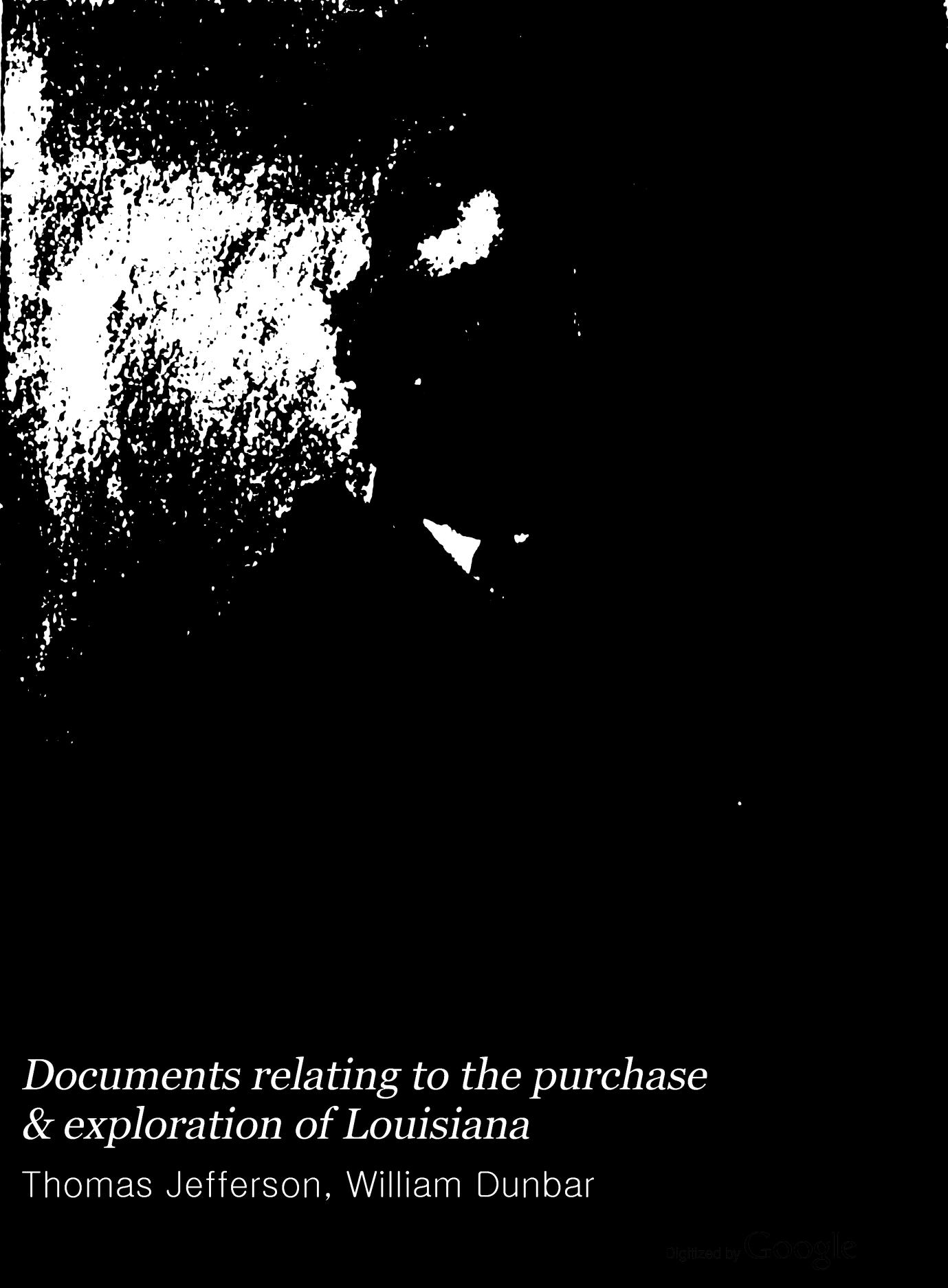
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# *Documents relating to the purchase & exploration of Louisiana*

Thomas Jefferson, William Dunbar

University of Virginia  
Libraries











**Documents**  
*Relating to*  
**THE PURCHASE & EXPLORATION**  
**OF**  
**LOUISIANA**



DOCUMENTS  
RELATING TO  
*THE PURCHASE*  
&  
EXPLORATION OF  
*Louisiana.*

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- I. The Limits and Bounds of *Louisiana*. By THOMAS JEFFERSON.
- II. The Exploration of the *Red*,  
the *Black*, and the *Washita* Riv-  
ers. By WILLIAM DUNBAR.

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## PUBLISHERS' NOTE.

THE two documents now first printed in this volume have been for nearly a century in the custody of the American Philosophical Society. The first is a paper written by Thomas Jefferson while President of the United States, which gives a summary of the various claims of France, Spain, and England to territory in the Mississippi Valley, and lays down the boundaries of the Louisiana Purchase. The original of this paper, in Mr. Jefferson's own hand, was deposited by him in the archives of the Society in Philadelphia, where it still remains. The second is the manuscript known to historians as the Dunbar Journal, the importance of which has been generally recognized, though but few have had access to it. The Journal was kept by William Dunbar of Natchez, on a voyage of exploration which, in company with Dr. George Hunter, he undertook by direction of the President in 1804, as a part of Mr. Jefferson's statesmanlike plan to survey the vast new territory just coming into the possession of the United States. This manuscript was presented to the Society by Daniel Parker, Adjutant and Inspector-General, U. S. A., on the 18th of July, 1817.

The Journal of William Dunbar is comparable to the more famous Lewis and Clark Journals, which were likewise placed in the keeping of the American Philosophical Society at the instance of Mr. Jefferson, and like them is a contribution of the first

order to the history of the earliest exploration of the country west of the Mississippi. Dunbar himself was a man of note, and has already been honored in his native state as "the first scientist of Mississippi." Born at Thunderton near Elgin, Scotland, a younger son of Sir Archibald Dunbar, he united, as so many eminent men among his countrymen have done, practical and scientific abilities of a high order. He settled in America in 1771, and became a successful planter. Later he held important trusts under the Federal government, was a correspondent of Thomas Jefferson, Sir William Herschel, David Rittenhouse, and other famous men, and made many contributions of importance to the scientific interests of the country, then in their infancy.

In addition to the Journal and the paper already mentioned on the boundaries of Louisiana, the volume includes the letter from Mr. Jefferson transmitting his manuscript to the American Philosophical Society, with some mention of the circumstances under which it was written, and an extract from Mr. Jefferson's message to Congress, transmitting a summary of the Dunbar Journal. The portrait of Mr. Jefferson is from the original by Thomas Sully, which now hangs in the rooms of the American Philosophical Society in Philadelphia. That of Mr. Dunbar is from the portrait at "The Forest," Dunbar's estate in Mississippi. The map is a photo-lithograph from the copper-plate engraving of Nicholas King's great map in the War Department at Washington.

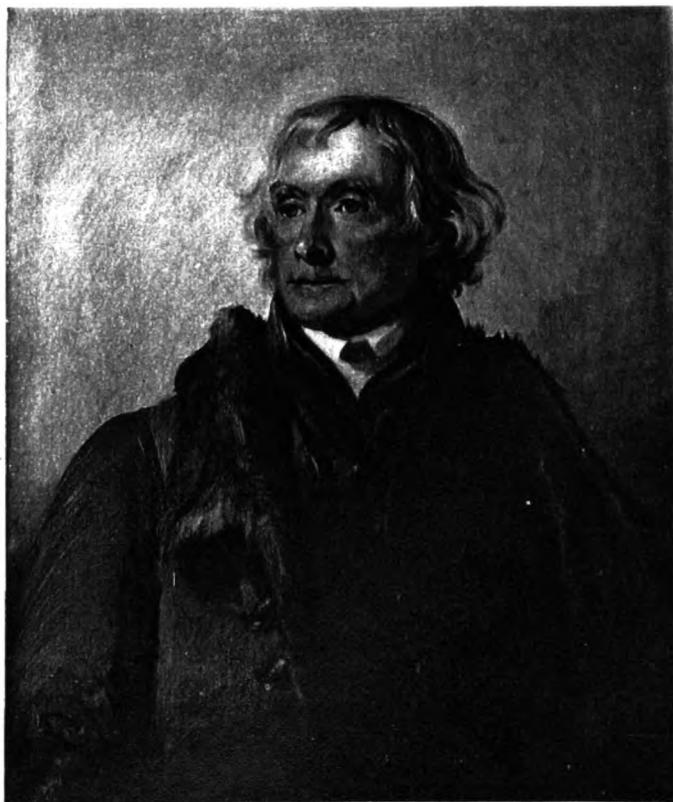
In printing these rare documents, care has been taken to preserve the peculiarities of spelling and the quaint abbreviations which were characteristic of the writing of the time.

The acknowledgments of the publishers are due to the American Philosophical Society for its courtesy in permitting the use of the manuscripts here printed, and also of the portrait of Jefferson by Sully; to the Secretary of the Society, Dr. I. Minis Hays, for his assiduous care in the difficult task of comparing proof, verifying names, etc.; and to Mr. William Dunbar Jenkins for the copy which he has kindly furnished of the portrait of Dunbar.

*Boston, May 9, 1904.*







Thomas Jefferson



*The*

LIMITS

and

*BOUNDS*

OF

*Louisiana*

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*By* THOMAS JEFFERSON



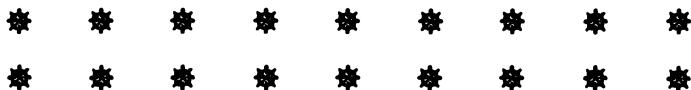




To *PETER S. Du PONCEAU*,  
 Corresponding Secretary of the Literary and  
 Historical Committee of the American  
 Philosophical Society.

*Monticello, Dec. 30, '17.*

DEAR SIR



**I**NOW send you the remains of my Indian vocabularies, some of which are perfect. I send with them the fragments of my digest of them, which were gathered up on the banks of the river where they had been strewed by the plunderers of the trunk in which they were. These will merely shew the arrangement I had given the vocabularies, according to their affinities & degrees of resemblance or dissimilitude. If you can recover Cap<sup>t</sup> Lewis's collection, they will make an important addition, for there was no part of his instructions which he executed more fully or carefully, never meeting with a single Indian of a new tribe, without making his vocabulary the 1<sup>st</sup> object. What Professor Adelung mentions of the Empress Catherine's having procured many vo-

*cabularies of our Indians, is correct. She applied to M. de la Fayette, who, thro' the aid of Gen<sup>l</sup> Washington, obtained several: but I never learnt of what particular tribes. The great works of Pallas being rare I will mention that there are two editions of it the one in 2. vols, the other in 4. vols 4<sup>o</sup> in the library I ceded to Congress, which may be consulted. But the Professor's acc<sup>t</sup> of the supposed Mexican MS. is quite erroneous, nor can I conceive thro' whom he can have received his information. It has probably been founded on an imperfect knolege of the following fact. Soon after the acquisition of Louisiana, Gov<sup>r</sup> Claiborne found, in a private family there, a MS. journal kept (I forget by whom) but by a confidential officer of the French government, proving exactly by what connivance between the agents of the Compagnie d'Occident, & the Spaniards, these last smuggled settlements into Louisiana, as far as Assinais, Adais etc. for the purpose of covering the contraband trade of the company. Claiborne being afraid to trust the original by mail, without keeping a copy, sent it on after being copied. It arrived safe and was deposited by me in the office of state. He then sent me the copy. On the destruction of the office at Washington by the British, apprehending the original might be involved in that destruction, I sent the copy to Col<sup>o</sup> Monroe, then Secretary of State, with a request to return it, if the original was safe, & to keep it, if not. I have heard no more of it. My intention was, & is, if it is returned to me, to deposit it with your Committee, for*

*safe keeping or publication. While on the subject of Louisiana, I have thought I had better commit to you also an historical Memoir of my own respecting the important question of it's limits. When we first made the purchase, we knew little of it's extent, having never before been interested to enquire into it. Possessing then in my library every thing respecting America which I had been able to collect by unremitting researches, during my residence in Europe particularly, and generally thro' my life, I availed myself of the leisure of my succeeding autumnal recess from Washington, to bring together every thing which my collection furnished on the subject of it's boundary. The result was the Memoire I now send you, copies of which were furnished to our Ministers at Paris and Madrid, for their information as to the extent of territory claimed under our purchase. The New Orleans MS. afterwards discovered, furnished some valuable supplementary proofs of title.*

*I defer writing to the Secretary at war respecting the observations of Longitude & Latitude by Capt. Lewis, until I learn from you whether they are recovered, and whether they are so compleat as to be susceptible of satisfactory calculation. I salute you with great esteem and respect.*

TH: JEFFERSON





## A Chronological Series of facts relative to Louisiana.

1673. **S**PAIN declares war against France.  
4. Russel's Mod. Eur. 68.

Joliet, an inhabitant of Quebec, & the Jesuit Marquette descended from Canada down the Missisipi to the Arkansas in 33°. & returned to Canada. 8. Rayn. 158. Hennepin N. D. 293.

1675. LaSalle goes to France to sollicit authority to explore the Miſipi. Joutel xvii.

1678. The peace of Nimezuen. 4. Russ. 92.  
LaSalle returned from France to Canada with Tonti to undertake to explore the Miſipi. Joutel xviii.

1679. He builds a fort at the mouth of the Miami of the lake. Hennepin Nouv. Decouvertes. 171.

1680. Jan. He builds a fort on the river Illinois. Hennep. N. D. 223. Called it Crevecoeur.

Feb. 29. Hennepin with 2. men leave the Illinois to descend the Miſipi in a

bark canoe. Hennep. N.D. 228. 241.  
Visits the Arcansas 258. The Taensas  
263. Reaches the sea. 272. Returns to  
the Illinois 294. 349. Nouv. voyage  
96. 1. Du Pratz. 4.

1681. La Salle visits fort Crevecoeur & leaves  
a garrison there of 15. or 16. men.  
Tonti. 147.

1682. La Salle & Tonti went down the Mišipi  
& named the country Louisiana. He  
went to the mouths of the Mišipi, ob-  
served their latitude, & returned to  
Canada. Joutel xvii. xx. Tonti 153. 1.  
Du Pratz 5. 2. Dumont 258. says in  
1679.

They build a fort, called Prudhomme,  
in the Chickasaw country 60. leagues  
below Ohio.

1683. Tonti 155. Reach the ocean Apr. 7.  
1683. Ib. 191. They have 60. persons  
in their company. Set out on their re-  
turn Apr. 11. 1683. Ib. 196.

Soon after this some Canadians, enticed by  
the flattering accounts of the country,  
went & settled near the mouth of the  
Mišipi, & on the coast. 2. Dum. 260.

1684. Spain declares war against France, but  
concludes at Ratisbon a truce of 20.  
years. 4. Rus. 141.

Jul. 24. La Salle sails from Rochelle with 4. vessels to seek the mouth of the Miſipi by sea. Joutel 2. Tonti 140. He had with him 100. souldiers & officers, in all 280. persons. Hennepin Nouveau Voyage. 12.

1685. Feb. 18. La Sale landed in the bay of S<sup>t</sup> Bernard, or S<sup>t</sup> Louis. Joutel 32. 1. Dupratz 6. Tonti 245. 2. Dum. 259 Builds a fort there. Tonti 245. 276. Left 100. men there Hen. N.V. 23. 130. persons. Joutel 45.

Apr. 22. He sets out with 20. men to seek a new place. Tonti. 249.

June. He makes a 2<sup>d</sup> settlement fur- ther up the river. 70. persons go to it. Joutel 49.

July. They abandon the first fort & go to the 2<sup>d</sup>. Joutel. 51. Called it and the neighboring bay S<sup>t</sup> Louis. Joutel 54.

Tonti descends the Miſipi with 40. men to meet LaSale. Tonti 220. recon- noitres the coast 20. leagues East and West of the mouth. On the jour de Paques (Easter) they set out on their return. 222.

Tonti builds a house on the river Arkansa & leaves 10. Frenchmen there. Tonti 225. Joutel says 6. men, 4 of whom

afterwards returned to Canada. Joutel 151. This becomes permanent. 226. 1. Dupr. 6. and is afterwards included in Law's grant, who settled it with Germans in 1719. 2 Dum. 68.

1686. Apr. 22. LaSale sets out for Illinois by land. Hennepin N.V. 39. but returns to Fort Louis. Ib. 63.

1687. Jan. 7. He sets out again with 20 men. Henn. N.V. 67. Is murdered. Joutel 99. Henn. N.V. 77.

LaSale's 2<sup>d</sup> fort at St Louis is afterwards abandoned. Tonti 329. Coxe. 39.

After the death of LaSale, Cavelier his brother, with 7. men, set out for Canada. Joutel 132.

July. They find the house on the Arkansas built by Tonti with only 2. men remaining in it. Jout. 151. They leave one of their company there. 157. They strike the Mišipi. Joutel 158.

Dec. 3. Tonti sets out from the Illinois, & descends the Mišipi a 2<sup>d</sup> time. Tonti. 317. Finds LaSale's 2<sup>d</sup> settlement broke up. 329. Finds at the Coroas 2. of the 7. French men who had separated from Cavelier after the death of LaSale. 331. Returns to Illinois. 331.

1689. War commenced by Spain against France.  
4. Russel. 228.

1696. Spain established a post at Pensacola. 9.  
Reynal. 128.

1697. Sep. 20. Treaty of Ryswick 4. Russell  
248.

1698. D'Hiberville discovers the mouth of the  
Miisipi. by sea. 2. Dum. 260.  
He is made Governor. 2. Dum. 260.  
He establishes a colony at Mobile, &  
Isle Dauphine. 260.

1701. The war of the Spanish succession begins,  
France & Spain being allies. 4. Rus.  
317.

1712. Sep. 14. Louis XIV. grants the exclusive  
commerce of Louisiana to Crozat.  
Possession & extent described Joutel  
196. 2. Dum. 260.

1713. Mar. 31. Treaty of Utrecht establishing  
the 49<sup>th</sup> degree of lat. as the division  
between Louisiana & the British  
Northern possessions.

1714. Mar. 6. Treaty of Rastadt.

1715. The French establish Natchitoches on  
Red river & build a fort 35. leagues  
above it's mouth. 2. Dum. 65.

1715. The Spaniards make settlements at the  
Assinais & Adais on one side & at Pen-

sacola on the other. 1. Dupratz 9. 13.  
14. (this was 7. or 10. leagues from  
Natchitoches) to restrict the French  
limits. 1. Dupratz. 14. 278.

1716. Crozat cedes his charter to the West  
India company. 2. Dumont. 6. 260.

1717. The company sent inhabitants to Isle  
Dauphine, where were some settlers  
before. 2. Dum. 7.

Hubert and Page settle at the Natchez.  
2. Dum. 60.

Fort Rosalie is built. 2. Dum. 60.

1718. Two other vessels are sent there. 2.  
Dum. 8.

France and England declare war against  
Spain. Quadruple alliance. 5. Rus. 6.

1719. The French take Pensacola. 1. DuPratz  
189. 2. Dumont 9. The Spaniards re-  
take it. 191. 12. The French take it  
again. ib. 195. 18.

France and Spain make peace. 5. Rus. 7.

France sends 800. settlers to Louisiana.  
DuPratz. xlviii.

Old Biloxi is settled. 2. Dumont 34.

Isle Dauphine is evacuated & every body  
removed to Old Biloxi, except a Ser-  
jeant & guard of 10. men. 2. Dum.  
36. 37.

New Biloxi is settled. 2. Dum. 42. 43.  
A cargo of Negroes arrives at Old Biloxi.  
ib.

The grantees now settle, every one on  
his own grant, to wit, at Old Biloxi,  
Bayagoulas, Point Coupée, Natchez,  
Yazous, Arkansas, Black river. 2. Dum.  
44.

New Orleans is laid off, 30 leagues above  
the mouth of Miſipi, where some set-  
tlers from Canada had already settled,  
& the seat of government is fixed  
there. 2. Dum. 47.

1720. A fort on the Missouri is built & gar-  
risoned. 2. Dum. 74. Called Fort Or-  
leans. Jeffry. 139.

DelaHarpe & Dumont, with 22. men,  
go 300. leagues up the Arkansa. A  
fine country. Salt springs, marble, pla-  
ster, slate & gold. 2. Dum. 70.

1722. The Balise is established, & a fort built  
on piles. 2. Dum. 57.

The Spaniards attempt a settlement  
among the Missouris, but are all mas-  
sacred to the number of 1500. 2. Dum.  
282.

1733. France, Spain & Sardinia commence war  
against the Emperor. 5. Rus. 27.

1735. Peace is made 5. Rus. 29.

1735

1736. The French build a fort at Tombicbee.  
1. DuPratz. 85.

1743. The Family compact made.

1748. The Treaty of Aix la Chapelle. 5. Rus.  
187.

1762. Spain enters as an ally with France into  
the war against England.  
Nov. 3. France cedes Louisiana West of  
Iberville to Spain by a secret treaty,  
and East of Iberville to England. Preliminary  
treaty. The King of France's  
order to L'Abbadie.

1763. The Treaty of Paris is made.

1783. Great Britain cedes the two Floridas to  
Spain.



### *Limits.*

**I**N 1680. the nearest settlements of Spain were  
on the river Panuco, 100. leagues West of  
the Miſipi. Hennep. N.D. 274. Coxe 115.  
Coxe's Carolana. 4.

In 1715. they make the settlements at Assinais  
& Adais, & Pensacola. 1. DuPratz. 9. 13.  
14. 278.

In 1722. they attempt one on the Missouri

which is prevented by the Indians. 2. DuPratz 157. 2. Dumont 282. Jeffry's hist. of the French Dominions in America. 139.

DuPratz says 'the coast is bounded to the West by St. Bernard's bay, where M. de la Salle landed.' and again 'on the East the coast is bounded by Rio Perdido etc. a little to the East of Mobile etc. 1. DuPratz. 216. and 'the Red river bounds the country to the North.' 1. DuPratz. 272.

2. DuPratz 301. says 'Canada lies to the North of Ohio, & inclines more to the East than the source of Ohio.' [Consequently the Ohio was not in Canada, and must therefore have been in Louisiana, as these two provinces were co-terminous.] And again 'the lands of the Illinois are reputed to be a part of Louisiana.' Ib. His book was published in 1758. and the translation in 1763.

The Translator of DuPratz, in his preface, says 'the mountains of New Mexico run in a chain of continued ridges from North to South, and are reckoned to divide that country from Louisiana, about 900. miles West from the Miſipi. Pa. xi.'

1712. The great document establishing with precision the boundaries of Louisiana, is Louis XIV's grant of this date to Crozat. to be found in the translation of Joutel. 196.

1763. Treaty of Paris Art. VI. France cedes to England the river & port of Mobile & every thing on the left side of the Miſipi, which she possesses or ought to possess except the island of N. Orleans: and Art. XIX. Spain cedes to England all she possesses East or S. E. of the Miſipi. Thus all Louisiana E. of the Miſipi. is acknoleged to England, and all English claims West of the Misipi acknoleged to Spain.

England divides the country South of Georgia, & East of the Iberville into two provinces, East & West Florida, by the Apalachicola.

1783. England, by Art. V. of the treaty cedes to Spain la Floride Orientale ainsi que la Floride Occidentale.

Spain re-establishes the government of Louisiana as before, & the government of Florida; that part of what the English had called West Florida being under the Governor of N. Orleans, & the rest under the Governor of Florida. See the Baltimore American Patriot. Vol. 1. N° 97. This is confirmed by M. D'Azara, Spanish Ambassador at Paris who told m<sup>r</sup> Livingston that Mobile made a part of Louisiana. See Liv's letter to Monroe. Paris. May 23. 1803.

Spain retrocedes to France by the treaty of S: Ildefonso.

1803. Apr. 30. France cedes to the US. Louisiana with the same extent that it now has, & that it had when France possessed it, and such as it ought to be after treaties passed subsequently between Spain & other powers.

‘Objections des Commissaires Anglois sur l’incertitude des limites de l’Acadie etc. ‘Les limites propres et anciennes de l’Acadie s’étendent depuis l’extremité de la baye Françoise jusq’au cap Canseau. L’objection d’incertitude sur ces limites ne peut donc tomber que sur celles de l’interieur des terres. Dans de pareils cas, la regle la plus usitée et la plus convenable est d’étendre les limites dans l’interieur des terres jusque à la source des rivieres qui se dechargent à la cote, c’est à dire que chaque nation a de son coté les eaux pendantes. C’est ainsi qu’on en a usé à la paix des Pyrenées pour fixer les limites entre la France et l’Espagne’ etc.

1. Memoires de l’Amerique. 116.





A N  
 Examination  
 I N T O  
 The boundaries of *Louisiana.*

THE French having for a century and a half been in possession of Canada, and its inhabitants penetrating to the remote waters communicating with the S<sup>t</sup>: Laurence, they learned of the Indians that, in the neighborhood of those waters, arose a great river, called the Missisipi, running due South to the sea, and through a fine country unpossessed by any white nation. In 1673. the Sieurs Joliet and Marquette, two Canadians, undertook to explore it, descended the Missisipi as far as the river Arkansa, in 33° & returned to Canada. Their account of it inflamed the enterprize of M. de la Salle, who in 1675, went to France to sollicit authority to explore the Missisipi. He obtained it, returned to Canada, and in 1680. went as far as the river Illinois, on the

lower part of which he built & garrisoned a fort called Crevecoeur, and sent the father Hennepin with 2. men to push his discoveries down the Mišipi as far as he could; &, as preparatory to a more formal essay, going himself Northwardly. Hennepin descended the Mišipi to the ocean, & returned with the information collected, to the Illinois. In 1682. La Sale & Tonti undertook their expedition; went down the river with 60. men, named the country Louisiana, built a fort in the Chickasaw country, 60 leagues below the Ohio, which they called Prudhomme, reached the ocean, and returned to Canada the ensuing year 1683.

La Sale then went to France, to obtain the means of going thence to the Mišipi directly by sea. In the mean time some Canadians descend the river, & settle near it's mouth, & along the coast Eastwardly, to the island of Massacre, opposite Mobile. The government of France, entering at once into the view of extending an united possession along the S<sup>t</sup>. Laurence & Mišipi, from sea to sea equips la Sale with 4. vessels, on board of which were 280. persons, of whom 100. were officers and soldiers furnished with all necessaries. He sailed in July 1684. from Rochelle, and missing the mouth of the Missisipi, landed Feb. 18. 1685. in the Bay of S<sup>t</sup>. Bernard to the West of it. Here he takes possession, makes two successive establishments, building and garrisoning

forts at each, the second of which was called S: Louis.

The Chevalier Tonti, about this time, sets out from Canada in quest of La Sale, whom he supposed to be then on the Miſipi, descends with 40. men to the mouth of the river, reconnoitres the coast 20. leagues East & West ; finding nothing of La Sale, he ascends the river, builds a house on the river Arkansa, and leaves 10. men in it, which becomes a permanent settlement, and he returns to Canada.

In 1686 La Sale attempts to penetrate from fort S: Louis to the Illinois by land, but is obliged to return. In 1687 he makes another attempt with 17. men, and is murdered on the way by some of his own people. Cavelier, brother of La Sale, undertakes the same enterprize with 7. men; they find the house on the Arkansa built by Tonti, with only two men remaining in it; they leave a third, strike the Miſipi, and reach Canada. Tonti descends the river a second time, finds two Frenchmen who had separated from Cavelier settled at the Coroas, and returns to the Illinois.

In 1689. a war commenced between France and Spain, which continuing till the treaty of Ryswick in 1697. suspended the aids of France to her colony: but in 1698. D'Iberville was sent as it's governor with recruits. He discovers the mouths of the Miſipi, and settles his new recruits

at Isle Massacre, which he calls Isle Dauphine, and at Mobile, where they find the Canadians who had settled there in 1683. Spain had, during the war, to wit, in 1696. taken a counter-post at Pensacola.

The result from these facts is that France had formal & actual possession of the coast from Mobile to the bay of S<sup>t</sup> Bernard, & from the mouth of the Miſipi up into the country as far as the river Illinois. The nearest Spanish settlements at this time were on the River Panuco, to the West, 100. leagues from the Miſipi, and at Pensacola, to the East . . leagues distant. There does not appear as yet indeed to have been any formal declaration of the limits of Louisiana: but the practice of nations, on making discoveries in America, has sanctioned a principle that 'when a nation takes possession of any extent of sea-coast, that possession is understood as extending into the interior country to the sources of the rivers emptying within that coast, to all their branches, & the country they cover.' 1. Mem. de l'Amerique 116. It was in support of this principle of virtual and declared possession, that France entered into the war of 1755 against Great Britain, whose settlements began now to reach the Eastern waters of the Misipi, and who opposed the claim of France, not on a denial of this principle, but on a prior possession taken & declared by repeated charters, thro' the space

of an hundred years preceding, as extending from sea to sea. France then had possession of the Miſipi, and all the waters running into it, and of the sea coast and all it's rivers & territories on them from Mobile to the bay of S<sup>t</sup> Bernard. The river Perdido, midway between the adversary possessions of Mobile & Pensacola, became afterwards the settled boundary between Spain & France, in the East, and the Rio Norte, or Bravo, midway between the bay of S<sup>t</sup> Bernard and the river Panuco, the then nearest settlement of Spain, was considered by France, if not by Spain, and on the same fair grounds as in the other quarter, as the boundary between them in the West. Besides being midway between the actual possessions of the two nations, that river formed a natural and well marked boundary, extending very far into the country Northwardly. And accordingly we find by several\* maps, some of them published by authority of the French government, and some Spanish maps, that France claimed to that river. This claim has not been abridged, as far as is known,

\* I possess three antient maps which mark the Rio bravo & it's Eastern branch as the dividing boundary between Louisiana & Mexico. 1. Moll's map of the West Indies & adjacent countries. 2. Moll's map of Louisiana etc. published in 1720. in which the South Western parts of Louisiana are said to be copied from a French map published in Paris in 1718. and 3. Homann's Spanish map of Louisiana of about the same date.

by any public treaty ; and those which are secret, if any such have taken place, cannot bind nations having no notice of them, & succeeding fairly to the rights of France, as publicly avowed & believed to exist.\*

But the extent of Louisiana into the interior country is not left merely on the principle of it's dependency on the coast into which it's waters disembogue : nor on the settlements extending up it's great rivers, the Miſipi, the Missouri, & the Illinois; but on an authoritative and public document announcing it's extent, and making a temporary disposition of it. This is the Letter patent of Sep. 14. 1712. by which Louis XIV. grants to the Sieur Anthony Crozat the exclusive commerce of that country for 15. years. The following extracts from it ascertain the extent of the country.

‘ Louis by the grace of god, king of France & Navarre to all etc.

‘ The care we have always had to procure the welfare & advantage of our subjects having induced us etc. to seek for all possible opportunities of enlarging & extending the trade of our American colonies, we did, in the year 1683. give our orders to undertake a discovery of the countries & lands which are situated in the Northern part of America, between

\* To this may be added the verbal declaration of the French Comm<sup>ee</sup> to those of the US. on the delivery of possession, that his positive instructions from his government were to take possession to the Rio Bravo.

New France & New Mexico : & the Sieur de la Sale, to whom we committed that enterprize, having had success enough to confirm a belief that a communication might be settled from *New France to the gulph of Mexico*, by means of large rivers ; this obliged us, immediately after the peace of Ryswick, to give orders for the establishing a colony there, & maintaining a garrison, *which has kept and preserved the possession we had taken in the very year 1683.* of the lands, coasts & islands which are situated in the gulph of Mexico, between Carolina on the East, & Old & New Mexico on the West. But a new war having broke out in Europe shortly after, there was no possibility till now, of reaping from that new colony the advantages that might have been expected from thence etc. And whereas upon the information we have received, concerning the disposition and situation of the *said countries known at present by the name of the province of Louisiana*, we are of opinion that there may be established therein a considerable commerce etc. we have resolved to grant the commerce of the country of Louisiana to the Sieur Anthony Crozat etc. For these reasons etc. we, by these presents, signed by our hand, have appointed, & do appoint the said Sieur Crozat to carry on a trade in all the lands possessed by us, and bounded by New Mexico, & by the lands of the English of Carolina, all the establishment, ports, havens, rivers, & principally the port & haven of the Isle Dauphine, heretofore called Massacre, the *river of S<sup>t</sup> Louis, heretofore called Missisipi*, from the edge of the sea as far as the \* Illinois ; together with the *river S<sup>t</sup> Philip, heretofore called the Missourys*, and

\* The French & Spaniards called by the name of *the Illinois*, or Illinois country, the whole country on both sides

of S: *Jérôme*, heretofore called *Ouabache*, with all the countries, territories, lakes within land, and the rivers which fall directly or indirectly into that part of the river S: *Louis*.'

THE ARTICLES. I. Our pleasure is that all the aforesaid lands, countries, streams, rivers & islands be, and remain comprised under the name of the government of *Louisiana*, which shall be dependent upon the general government of New France, to which it is subordinate: & further that all the lands which we possess from the *Illinois* be united etc. to the general government of New France, & become part thereof etc.' [here follow 15. other articles relating to commerce only] 'Given at *Fontainebleau* the 14<sup>th</sup> day of Sep. in the year of grace 1712 and of our reign the 70<sup>th</sup> *Louis*. By the king *Phelipeaux*.'

Here then is a solemn & public declaration sufficiently special to shew that all the waters running directly or indirectly into the *Mišipi*, and the country embraced by them, are held and acted on by France, under the name of the province of *Louisiana*; and is a full & unequivocal supplement, if any supplement were necessary, to the titles derived, 1. from the actual settlements on the river and it's waters, 2. from the possession of the coast, & 3. from the principle which annexes to it all the depending of the Upper *Mišipi*. That on the Eastern side was called *East Illinois*, that on the West side *West Illinois*.

waters. The treaties of Ryswick, in 1697, where France & Spain were adversary powers, & those of Utrecht in 1713. & Rastadt in 1714. where they were allies, by their silence, as well as by their provisions, as to these countries, must be considered as sanctioning the rights of France to this province : to which add the progress made by France, undisturbed & unquestioned, by Spain, in extending her settlements *ad libitum* within them, till 1763. It is true that in 1715. some Spaniards made small settlements at the Assinais, & Adais, & in 1722. attempted one on the Missouri. The last was prevented by the Indians, and the former were connived at by the Agents of France to favor a smuggling commerce with New Mexico. But these contraband encroachments cannot weigh as evidence of ownership against the possession taken by France 30. years before, & the solemn establishment of boundary by Louis XIV.

War breaking out between them in 1718. the French took Pensacola ; the Spaniards retook it, but the French recovered & retained it till the peace in 1719 when it was restored to Spain ; and from this epoch the river Perdido has been the acknowledged and undisturbed boundary between Louisiana and Florida.

The boundaries of Louisiana then, as held by France, were the sea-coast & islands from the river Perdido to the Rio Norte or Bravo,

then up the Rio Bravo to it's source ; thence to the highlands encompassing the waters of the Miſipi, and along those highlands round the heads of the Missouri & Miſipi & their waters to where those highlands assume the name of the Alleganey or Apalachian mountains, thence along those mountains, and the highlands encompassing the waters of the Mobile, to the source of the Perdido, & down that to the ocean.

In opposition to these claims, both of France and Spain, were those of the then English colonies, now the US. whose charters extended from sea to sea, and consequently covered all Louisiana & Mexico, above the parallel of latitude which formed the Southern boundary of Georgia. These adversary claims were settled by the war of 1755-1763. and the treaty of Paris which closed it, and which made the Miſipi & Iberville the Western limit of the English possessions, and thenceforward the Eastern limit of Louisiana.

This war had begun between France & England, Spain being unconcerned in the grounds of it. In the beginning, France had sensibly the advantage, but after awhile it's successes were signally on the side of England. In 1762 Spain entered into it as a volunteer & ally of France. Great Britain immediately attacked & took the town of Havanna, & an important portion of the

island of Cuba; which imminently endangering the continental possessions of Spain within the gulf, and her communication with them, negotiations for peace were very soon set on foot. Great Britain, in exchange for her conquest in Cuba, required Florida, & that part of Louisiana from the Perdido to the Iberville. Besides the just sympathy which France felt for Spain, who had sustained this incalculable loss by friendly endeavors to aid her, she was bound by the family compact, lately renewed, Article XVIII. 'to consider the interests of Spain as her own, & to share in it's losses and advantages.' A considerable change too had taken place in the minds of the government of France, against the possession of distant colonies, which could not be protected but by a great navy. France therefore, by a secret treaty, Nov. 3. 1762. (being the same day on which they publicly signed the preliminary articles with Gr. Britain) consented to cede all Louisiana to Spain, in order to enable her, by the sacrifice of such part of it as she thought proper, to ransom Cuba, and to indemnify her for the loss of Florida, required also by Great Britain to make up the equivalent. The portion of Louisiana from Iberville to Perdido therefore, ceded to Great Britain by the definitive treaty of Feb. 10. 1763. did in substance move from Spain to Gr. Britain, altho' France, as not having publicly conveyed

it to Spain, was the formal conveyor to England. Yet she acted herein merely as the friend & agent of Spain, who was become in truth the real proprietor of all Louisiana. The importance of seeing this transaction in it's true light will hereafter appear.

England immediately laid off this portion of Louisiana, with so much of Florida as laid West of the Apalachicola, into a separate government, to which she gave the name of West Florida; and the residue of Florida into another government, to which she gave the name of East Florida. And Spain, now proprietor of Louisiana, & of course free to curtail it's future boundary to the Westward, according to her own convenience, extended the limits & jurisdiction of New Mexico to the waters of the river Mexicana inclusively. But this cannot disprove the former extent of Louisiana, as it had been held & ceded by France; but was done in virtue of the right ceded by France.

The war of 1775-1783. began between Great Britain & the US. but France and Spain at length became parties to it. By the treaty of Paris of 1783. which terminated it, Gr. Britain was constrained to restore to Spain Florida, and the territory East of the Iberville, which she had received at the close of the former war in exchange for Cuba. If the portion of Louisiana comprised in it had really moved from

France, then the restitution of the portion between Iberville & Perdido should have been to France, and that of Florida only to Spain. But as the whole had moved substantially from Spain, the whole was restored to her. On re-entering into possession Aug. 18. 1769. she continued the English annexation of the Eastern portion of Louisiana with a part of Florida, under the name of West Florida; restoring however the whole to the jurisdiction of the Governor of Louisiana, residing at N. Orleans: and in public \* instruments, as well as in common parlance that portion has been spoken of under the names of Louisiana, or of West Florida indifferently.

The nation of France had seen with considerable dissatisfaction the separation of Louisiana from the mother country. That province had ever been viewed by it with great partiality. It was inhabited by their relations & fellow citizens: & they considered Spain, in the immensity of her possessions, as not entitled to such a sacrifice from France. Besides she had now got back both Florida & Cuba: and there was no justice in her continuing to retain Louisiana, which had been ceded to her only as an indemnification for the loss of one, & the means of getting back the other. As soon therefore as the successful administration of the first Consul of

\* One of these was deposited in the office of state.

France had raised her into a condition for re-demanding from other nations what she deemed her rights, Spain was required to make restitution of Louisiana, under the friendly cover indeed of an exchange, but it's inequality shews it was but a cover. The real grounds of restitution required that it should not be mutilated, but full and entire as she received it. For what had she ever given for it? She was compleatly replaced in her antient possessions. On what just ground then could she propose to retain any portion of the equivalent ceded only as an indemnity for them? Accordingly a compleat retro-cession was provided for by the treaty of S: Ildefonso of Oct. 1. 1800. by definitions studiously formed to reach every thing which had been ceded to or for her by France. By that instrument she re-cedes to France the colony or province of Louisiana, with the same extent 1. that it now has in the hands of Spain. 2. that it had when France possessed it, and 3. such as it ought to be after the treaties passed subsequently between Spain and other powers. That is 1. she is to recede the antient country of Louisiana, as it is now recovered back into the hands of Spain & held by her under the name of Louisiana, or West Florida, or Mexico, or by whatever other names she or other powers may since have chosen to designate certain parts of it, or to sever it by overlapping Mexico on it's West, and West

Florida on it's Eastern quarter: she is to recede the *thing*, as it is in her hands, unaffected by new names. To make it still plainer, she is to retrocede it 2<sup>dy</sup> with the same extent that it had when France possessed it. Now France never possessed it one day with any less extent than from the Perdido to the Rio Norte, & inland to the sources of all it's rivers. The whole of this extent she transferred on the same day by two treaties of equal date, to wit, all Westward of the Miſipi & Iberville to Spain, & all Eastward to Great Britain. But, of the Eastern portion, Spain having since recovered back all below 31°. of latitude, that, with the Western side, composes Louisiana, as now in the hands of Spain, and as it had been possessed by France. But, not to disturb the right of the US. to the portion North of 31°. and to shew that it was only so much of the Louisiana held by France, as *was now in the hands of Spain*, it is expressly limited 3<sup>dy</sup> to be such as it ought to be after the treaties passed *subsequently* between Spain & other powers. *Subsequently* to what? To the cession of the country by France. When was that session? Nov. 3. 1762. and Feb. 10. 1763. What are the treaties subsequent to this? Those affecting the limits of Louisiana are the treaty of Sep. 3. 1783. with Great Britain, & that of Oct. 27. 1795. with the US. The former was a restitution, by Gr. Britain to Spain, of Florida,

& the portion of Louisiana from the Perdido to the Iberville : and consequently, *after this treaty*, the extent of Louisiana *ought to be*, as again consolidated to the Perdido. But inasmuch as by the latter of these two treaties, Spain had confirmed to the US. a degree of latitude [from  $32^{\circ}$ . to  $31^{\circ}$ .] which she had long contended to be an unceded part of Louisiana, & consequently not within the limits of the US., therefore by this provision, that right is saved to the US. & the extent of Eastern Louisiana, *after this treaty, ought to be* only to the latitude of  $31^{\circ}$ .

Should it be alledged that this confirmation of the diminutions of Louisiana by treaties subsequent to it's alienation by France, goes to the treaty of 1763. with Gr. Britain also ; the answer is that this treaty was *simultaneous* with the alienation, & not subsequent to it, and therefore could not be within the scope of this definition. The confirmation too is in favor of treaties made *by Spain*, with other nations. That with Great Britain is by *France and Spain*. But it might also be justly observed that Louisiana was not lessened in it's dimensions by that treaty ; it was only divided, the Eastern portion thereof transferred to Great Britain, the Western to Spain ; who might new-name a part of it West Florida, & a part Mexico, for their internal purposes, as they pleased ; but when the portion newly called

West Florida came back to *the hands of Spain*, it was still a part of antient Louisiana, *as possessed by France, as now in the hands of Spain, & unalienated by subsequent treaties of Spain with other powers.*

On the whole, the intention of the treaty of S: Ildefonso is clearly this. France had in 1763. generously ceded all Louisiana to, or for Spain. Spain consented that the Eastern portion of it, below Georgia, together with her Florida, should go to recover Cuba. Afterwards however, in another war, by the arms of France and of the US. (for Spain came in late, & then did little more than waste her resources on the rock of Gibraltar) she recovers back, and has secured to her, her antient Florida, & the Eastern portion of Louisiana, below Georgia. The treaty of S: Ildefonso therefore meant to review this whole transaction, & to restore France & Spain to the *Status quo* prior to the war of 1755.-63. Spain being now in possession of her original colonies of Florida and Cuba, it was just, & was meant, that France should also be reinstated in Louisiana, so far as Spain, while it was in her hands, had not transferred portions of it by permanent alienations to other powers. She confined her reclamation therefore to the part of her antient possession which was in the hands of Spain, not touching the portions which had been validly transferred to the US.

If Spain then were not to deliver the country from the Iberville & Missipi to the Perdido, this would not be delivering Louisiana with the extent it had when France possessed it, & before it had ever been dismembered: nor with the extent it *now* has in the hands of Spain, since it has been restored to it's antient & integral form: nor such as it ought to be after the treaty subsequently passed with England in 1783. And we trust that these definitions are too exact & unequivocal, & Spain too just, to admit any doubt of what we are entitled to demand, & she bound to deliver.

Whatever Louisiana was, as retroceded by Spain to France, such exactly it is, as ceded by France to the US. by the treaty of Paris of April 30. 1803.

Sept. 7, 1803

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*P. S. The Northern boundary of Louisiana, Coterminous with the possessions of England.*

THE limits of Louisiana have been spoken of in the preceding statement, as if those established to the West & North, by the charter of Louis XIV. remained still unaltered. In the West they are so, as already explained. But, in

the North, a material change has taken place. With this however it was unnecessary to complicate our subject, while considering the interests of Spain alone: because the possessions of Great Britain, & not of Spain, are coterminous with Louisiana on its Northern boundary. We will now therefore proceed to examine the state of that boundary, as between Gr. Britain & the US.

Disputes having arisen between Gr. Britain & France as to the limits between Canada & Louisiana on the one side, & the countries of the Hudson's bay, & North Western companies on the other, it was agreed by the treaty of Utrecht (1713) Art. X. that 'Commissaries should be forthwith named by each party to determine the limits between the bay of Hudson and the places appertaining to the French, & to describe & settle the boundaries between the other British and French colonies in those parts' these Commissaries accordingly fixed the Northern boundaries of Canada & Louisiana, by a line beginning on the Atlantic, at a Cape or Promontory in  $58^{\circ}30'$  N. Lat. thence South Westwardly to the lake Misgosink, or Mistassin, thence farther S. W. to the lat. of  $49^{\circ}$  North from the Equator, and along that line indefinitely. [Hutchins's topographical description of Louisiana. pa. 7.] Thus the Northern boundary of Canada and Louisiana became fixed, & the

latter particularly became changed to the parallel of 49° from the Equator, instead of the highlands inclosing the Northern waters running directly or indirectly into the Misipi, as settled by Louis XIV. Canada being, by the peace of 1763. transferred to England, it's Southern boundary was settled by the treaty of 1783. with the US. along the S<sup>t</sup> Croix & highlands bounding the Southern waters of the S<sup>t</sup> Lawrence, the 45<sup>th</sup> degree of latitude to the water communication between the lakes, and along that communication to the lake of the woods; whence the line of the US. was to run due West, till it should strike the Missisipi. Now, according to the maps of that time, and particularly Mitchell's on \* which the boundary of 1783. was predicated, the line of 49° passes through the Southern part of the lake of the Woods: and the North Western point of the lake of the Woods, as observed by Thompson, Astronomer to the North West company, is in Lat. 49°-37'. [McKenzie's 2. voyage chapt. 13.] At that lake therefore the English negotiators ceased to pursue the water communication, because, South of the latitude of that lake, they owned nothing: and to have followed the water line further Northwardly, would have broken in upon the continuity of their Southern boundary. Canada

\* The identical map used by the negotiators, with their MS. marks on it, is deposited in the office of state.

was thus closed to the West, by it's Northern & Southern limits meeting in a point in the lake of the Woods. It was at that time believed that the Missisipi, heading North of  $49^{\circ}$  would have been intersected by that line of latitude, and our possessions consequently closed. But subsequent information rendered it probable that that river did not extend so far North; (it is now said only to  $47^{\circ} 38'$ ) and consequently that there was an unclosed space between it's source & the lake of the woods. Without undertaking to decide what were the limits dividing Great Britain & Spain in that quarter, we concluded it would be safest to settle, as occasions should offer, our boundary there with both nations, on the principle of 'valeat quantum valere potest' with each. Having to form a convention with England for ascertaining our limits in the North Eastern quarter, we took that occasion for closing, as far as depended on her right, the vacancy in our North Western angle; & therefore proposed it to her. While negociations were going on at London for this purpose, an opportunity occurred of our acquiring Louisiana: and the stipulations being promptly concluded, a treaty for that acquisition was actually signed at Paris twelve days before that of London was concluded. But this treaty was not known to the negotiators of either party at London; nor could the rights acquired by it, be affected by arrange-

ments instituted & compleated there merely for the purpose of explaining and supplying the provisions in the treaty of 1783. In result, this acquisition rendered these explanations unnecessary, and the V<sup>th</sup> article respecting them merely nugatory. For England holding nothing in that quarter Southward of 49° the line proposed in the V<sup>th</sup> article, from the North Western point of the lake of the Woods Southwardly to the nearest source of the Miſipi, is through a country, not belonging to her, but now to the US. Consequently the consent of no other nation can now be necessary to authorize it. It may be run, or not, and in any direction which suits ourselves. It has become a merely municipal object respecting the line of division which we may chuse to establish between two of our territories. It follows then that the V<sup>th</sup> Article of the Convention of London of May 12. 1803. should be expunged, as nugatory; and that instead of it, should be substituted one declaring that the dividing line between Louisiana & the British possessions adjacent to it, shall be from the North Western point of the Lake of the Woods, along the water edge Westwardly to it's intersection with the parallel of 49° North from the Equator, then along that parallel (as established by the treaty of Utretcht between Gr. Britain & France) until it shall meet the limits of the Spanish province next adjacent. And it

would be desirable to agree further that, if that parallel shall, in any part, intersect any waters of the Missouri, then the dividing line shall pass round all those waters to the North until it shall again fall into the same parallel, or meet the limits of the Spanish province next adjacent. Or, unapprised that Spain has any right as far North as that, & Westward of Louisiana, it may be as well to leave the extent of the boundary of  $49^{\circ}$  indefinite, as was done on the former occasion.

Jan. 15. 1804.



THE EXPLORATION OF THE  
*RED, THE BLACK, AND THE*  
*WASHITA RIVERS.*

**This Manuscript presented to the  
American Philosophical Society**

**by D. Parker**

**Phil: 18 July 1817**

**Rec<sup>d</sup> thro' Dr Cutbush**

Extract from the ~~Message~~ from  
the *President* of the UNITED  
STATES, read in Congress,  
February 19, 1806.

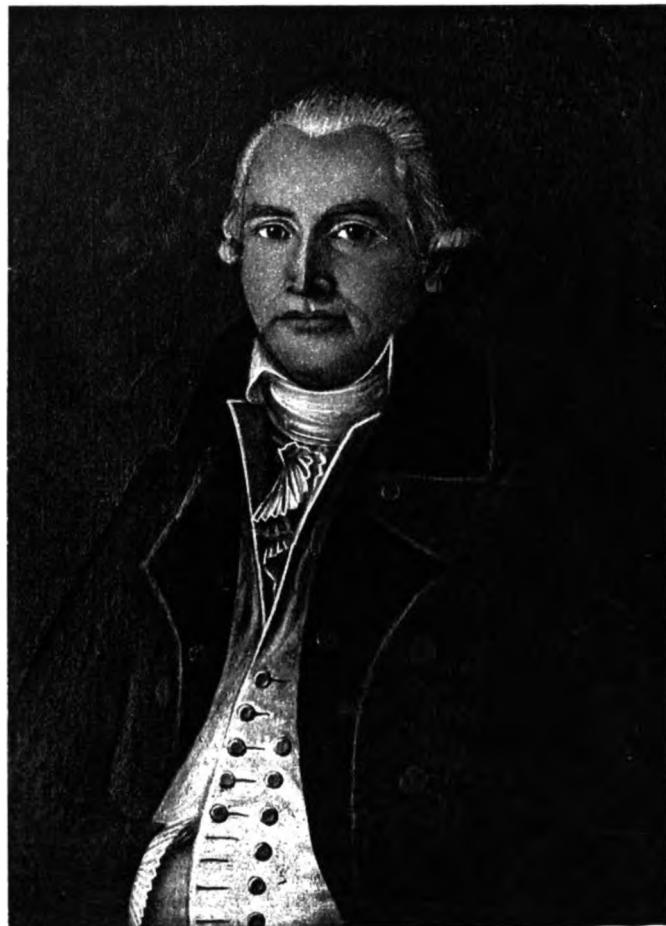
“HAVING been disappointed, after considerable preparation, in the purpose of sending an exploring party up that river, in the summer of one thousand eight hundred and four, it was thought best to employ the autumn of that year in procuring a knowledge of an interesting branch of the [Red] river called the Washita. This was undertaken under the direction of Mr. Dunbar, of Natchez, a citizen of distinguished science, who had aided, and continues to aid us, with his disinterested and valuable services in the prosecution of these enterprises. He ascended the river to the remarkable hot springs near it, in latitude  $34^{\circ} 31' 4".16$ , longitude  $92^{\circ} 50' 45"$  west from Greenwich, taking its courses and distances, and correcting them by frequent celestial observations. Extracts from his observations, and copies of his map of the river, from its mouth to the hot springs, make part of the present communications. The examination of the Red river itself, is but now commencing.

TH: JEFFERSON.

February 19, 1806.







Guill<sup>o</sup> Dunbar



# *JOURNAL*

OF A

## *Voyage*

Commencing at *S<sup>t</sup> Catherines* landing, on the East bank of the *Mississippi*, proceeding downwards to the mouth of the *Red* river, and from thence ascending that river, the *Black* river and the *Washita* river as high as the *Hot-Springs* in the proximity of the last mentioned river.



This voyage was undertaken by  
the late *William Dunbar Esq* of Natchez 1804  
in Company with George Hunter.—

This Journal  
was kept by Mr Dunbar — & is 200 pages

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The Geometrical Survey of the  
Rout will be found at the End consist'g of 64  
Pages in his hand writing.

Philad. 18 July 1817

*Jn. Vaughan*

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# JOURNAL

## OF A *VORAGE*

**S**ET out from S<sup>t</sup> Catherine's landing in 1804  
October 16<sup>th</sup>  
Tuesday the afternoon. The Latitude of this place is  $31^{\circ} 26' 30''$  North; and Longitude  $6^{\text{h}} 5' 56''$  — west of Greenwich.

A little below are the white cliffs 5 leagues below the Natchez the face of the cliffs is chiefly white sand surmounted by pine; the cliffs are from 100 to 200 feet high; when the waters are low the basis of the cliffs are uncovered consisting of clay of different colours and some beds of ochre covered here and there by a thin lamina of iron ore; small springs possessing a petrifying property flow over the clay and ochre; numberless logs and pieces of timber converted into stone are strewed about the beach. Fine pure argil of various colours chiefly white and red is found here. Encamped at night upon an Island 7 miles below the place of departure.

Set

1804      }  
 October      }  
 Wednesday      }  
 17<sup>th</sup>      }      Set off ; passed Fort Adams, and six miles  
                   farther the line of demarcation, and arrived at  
                   the mouth of red river about nine miles below  
                   the line of demarcation ; encamped just within  
                   its mouth ; the waters of this river have a red  
                   appearance from a rich fat earth or marl of that  
                   colour born down by the floods from which it  
                   derives its name ; the mouth of the river is about  
                   five hundred and fifty yards wide : here we com-  
                   menced taking the meanders of the river by  
                   course and time depending upon the log to  
                   inform us of our rate of going as well as the  
                   velocity of the Current ; there is however no  
                   sensible Current at the mouth : the banks on  
                   both sides are here clothed with willows, the  
                   land is low and subject to inundation to the  
                   height of 30 or more feet above the present  
                   level of the waters, the mouth of the red river  
                   is accounted to be 75 leagues from New-orleans  
                   and 3 miles above the exit of the Chafalaya or  
                   Opelousa river which was probably the continua-  
                   tion of the red river, when perhaps its waters  
                   did not unite with those of the Mississippi ex-  
                   cepting during the inundation. M de Ferrer has  
                   settled the Latitude and Longitude of this place ;  
                   the first at  $31^{\circ} 1' 15''$  N. and the last at  $6^{\text{h}} 7' 11''$   
                   west of Greenwich.

Thursday 18<sup>th</sup>      Set off up the river, remarked vegetation to  
                   be surprisingly luxuriant along the banks owing  
                   no

no doubt to the rich red marle yearly deposited by the floods of the river — willows grow to a good size, but other forest trees are much smaller than those seen upon the banks of the Mississippi, which may be owing to the newly formed soil or its excessive richness. The river narrows gradually as we advance: at noon it was about 200 yards wide. Got out the instruments, which requiring a good deal of adjustment we were unable to make perfect observations. The Latitude  $31^{\circ} 8' 54''$ .6, perhaps accurate enough to correct the traverse of the river.\* The banks of the river are luxuriantly clothed with peavine and several kinds of grasses yielding seed, of which geese and ducks are very greedy: got our log line prepared and divided into perches — hove the log and found we went at the rate of 4 perches in half a minute. i. e.  $1\frac{1}{2}$  mile per hour — very slow — Soldiers do not exert themselves at the oar; came to, for the night having made nearly 13 miles — hove the lead in the middle of the river and found 11 fathoms. There are generally willows growing on one side of the river, and on the other the same small growth of forest trees continues, consisting chiefly of black oak, packawn, hickory, elm &c. The Trees are so exceedingly grand & lofty upon the banks of the Mississippi, that by

\* The place of observation was at the extremity of the Course N  $32^{\circ}$  E  $17'$  to a p: on the left.

comparison

1804 } comparison those bordering on this river seem  
 October } dwarfish, and appear to bear a kind of proportion  
 to the magnitude of their own river. The extremes of temperature were from 46° to 48° of Farhenheits thermometer. Made this day 12  $\frac{55}{60}$  miles.

Friday 19<sup>th</sup> Continued our rout up the river; having given the Soldiers this morning a few words of advice and encouragement, they improved considerably in activity and cheerfulness, hove the log and found we went 7 perches per half minute, the Current yet continues so moderate as to offer no impediment to our rowing along shore therefore not worth estimating: landed before 12 to observe and for dinner. Latitude 31° 14' 50".1. After dinner caught a runaway negro; proceeded on to the confluence of red and black river in Latitude 31° 15' 48" which by our reckoning appears to be 26  $\frac{1}{3}$  miles from the Mississippi, the Contrast of the two rivers is great, the red river being charged with red marly earth and the other a clear river gives it by comparison a dark appearance, hence the name of black river— Each river is about 150 yards and when united about 200 yards wide. Sounded in the black river and found 20 feet black sand, little or no current. Took specimens of the red marl of red river bank. The water of the black river is rather clearer than that of the Ohio and of a warm

warm temperature, probably owing to the waters { 1804  
which flow into it from the valley of the Mis- { October  
sissippi particularly from the Catahoola. Made  
15 miles 102 perches.

Continue ascending the river ; Thermometer Saturday 20  
47° Temperature of the water 73° a spring issuing  
from the river bank 66° Forest trees on the  
banks chiefly red and black oak interspersed with  
ash, paccawn, hickory, some elms, pirsimon &c ;  
several kinds of grass and many humble plants  
in flower, so that even at this season our country  
affords employment for the Botanist. Great lux-  
uriance of vegetation along the shore, grass very  
rank, and a thick curtain of shruberry of a deep  
green ; the soil black marl mixed with a mod-  
erate proportion of sand, resembling much the  
soil on the Mississippi banks, yet the forest trees  
are not lofty like to those on the margin of the  
great river, but resembling the growth on the  
red river. I omitted mentioning in its proper  
place, that the last single inundation of the red  
river appears to have deposited on the high bank  
a stratum of red marl above  $\frac{1}{2}$  inch thick now  
dry ; some specimens were taken. Took a me-  
ridian altitude of the Sun, from which the Lat-  
titude deduced was  $31^{\circ} 22' 46''$ .6—observed Canes  
growing on several parts of the right bank, a  
proof that the land is not deeply overflowed,  
perhaps from 1 to 3 feet : the banks have the  
appearance

1804 } October } appearance of stability, very little willow or other  
 productions of a newly formed soil being seen on either side: the solid high bank being deeply shaded by vegetation from the humble creeping plant to the spreading oak. Encamped at sun-set. Sounded; 5 fathoms — black sand — Extremes of the Thermometer 47°—80°. Made this day 13 miles 40 perches.

Sunday 21<sup>st</sup> Thermometer before sun-rise 60°. Continue ascending; no current to imped us, for altho' there be a feeble current along the principal thread of the stream, yet as this is deflected from bend to bend, we easily avoid its influence by directing our course from point to point or rather passing a little under the points, and in fact where there is any current, a compensation is found by the counter current or eddy under the points. The river is now only 80 yards wide; the timber becomes larger, the banks in some places 40 feet high, yet liable to inundation, not from the floods of this small river, but from the intrusion of its more powerful neighbour the Mississippi: The lands decline rapidly (as in all alluvial countries) from the margin to the Cypress swamps, where more or less water stagnates all the year round. The current of the river is still so insensible even in the thread of stream, that we take no account of it: at 8<sup>h</sup> a.m. we arrived at an Island, small but elevated, said to

to be the only one in this river for more than { 1804  
100 leagues ascending. On the left bank near { October  
the Island is a small settlement commenced by  
a man and his wife: a covered frame of rough  
poles without walls serves for a house, and a  
Couple of acres of Indian corn had been culti-  
vated, which suffices to stock their little maga-  
zine with bread for the year; the forest supplies  
Venison, Bear, turkey &c, the river fowl and  
fish; the skins of the wild animals and an abun-  
dance of the finest honey being carried to market  
enables the new settler to supply himself largely  
with all other necessary articles; in a year or  
two he arrives at a state of independence, he  
purchases horses, cows & other domestic animals,  
perhaps a slave also who shares with him the  
labours and the productions of his fields & of  
the adjoining forests. How happy the contrast,  
when we compare the fortune of the new settler  
in the U. S. with the misery of the half starving,  
oppressed and degraded Peasant of Europe!! —  
The banks here are not less than 40 feet above  
the present level of the river water and but rarely  
*overflowed*; the nearest road to the high lands  
at the Rapid-settlement on the red river, nearly  
west is said to be 40 miles thro' an inundated  
alluvial country; it is probable the direct dis-  
tance does not much exceed one half, the nu-  
merous lakes in the overflowed lands rendering  
the road very circuitous: both banks are clothed  
with

1804 } with rich Cane-brake, pierced by many creeks  
 October } fit to carry boats during the inundation: saw  
 many Cormorants and the stately Hooping  
 Crane: Geese and Ducks not yet abundant;  
 they arrive in myriads with the rains & winter  
 cold: Landed before noon to observe: we had  
 been disappointed at the hour of breakfast by  
 clouds in making observations for the magnetic  
 variation and for regulating the time & rate of  
 going of the watch, preparatory to the lunar  
 observation, & now apprehended the same dis-  
 appointment, the heavens being loaded with  
 flying clouds: just before the Sun was expected  
 on the meridian, a dense cloud concealed him  
 from view, when he reappeared he was already  
 dipped a little; the latitude deduced is undoubt-  
 edly too far North  $31^{\circ} 37' 52''.5$  the sun had  
 therefore not attained his meridian altitude.

This afternoon found the shore favorable for  
 tracking, (i. e.) running along shore & towing  
 the boat; rate of going by log a little improved  
 5 perches p.  $\frac{1}{4}$  minute. At 3<sup>h</sup> p. m. therm<sup>o</sup>  
 $83^{\circ}$ .— The banks have a regular shelving slope  
 from the top to the water's edge & are totally  
 covered with the most luxuriant herbage con-  
 sisting chiefly of 5 or 6 kinds of strong grass  
 yielding vast crops of seed nearly mature, upon  
 which Geese and Ducks get surprisingly fat:  
 we shot some water fowl of the Duck kind,  
 whose web-foot was partially divided, the body  
 covered

covered with a bluish or lead coloured plumage; { 1804  
 they were extremely fat and excellent, resembling in taste the Canvass-back. The teal of { October  
 these rivers is also very fat and fine. Wind S.S.E. and cloudy. Encamped. Extremes of the thermometer  $60^{\circ}$ – $83^{\circ}$ . Made this day 14 miles 59 perches.

Thermometer before sun-rise  $65^{\circ}$  Wind S.S.E. Monday 22<sup>d</sup> cloudy. A few drops of rain before day: set off as soon as we could get the men ready & on board.— Soldiers slow in their movements— continues cloudy & threatens rain. Green matter floating on the river, supposed to come from the Catahoola and other lakes and bayoos of stagnant water, which when raised a little by rain flow into the black river. Saw also many patches of an aquatic plant resembling little Islands, some floating on the surface of the river, and others adhering to or resting on the shore and logs; examined the plant & found it to be a hollow jointed stem with roots of the same form; extremely light with very narrow willow shaped leaves projecting from the joint, embracing however the whole of the tube extending to the next inferior joint or knot; the extremity of each branch is terminated by a spike of very slender and narrow seminal leaves from one to two inches in length and  $\frac{1}{10}$  or less in breadth, producing its seed on the under side of

1804 } of the leaf in a double row, almost in contact,  
 October } the grains alternately placed in perfect regular-  
 ity: I have not been able to detect the flower,  
 so as to be able to determine the class and order  
 to which the plant belongs, it is not probably  
 new; I at first supposed it might be the same  
 which is described by M<sup>r</sup> Bartram as occupying  
 large portions of the surfaces of rivers in East  
 Florida, but upon examination I found it to be  
 entirely different.

The day continued cloudy; at noon it rained,  
 we had consequently no observation for the Lat-  
 itude. At 3<sup>h</sup> p. m. therm<sup>r</sup> at 79°—the afternoon  
 continued cloudy. The current is yet insensible  
 as to any opposition made to our progress.  
 Sounded in the evening, found 3½ fathoms, the  
 river being now considered very low. Extremes  
 of the therm<sup>r</sup> 65°—79° Wind S.S.E. Cloudy—  
 made 13 miles 76 perches.

Tuesday 23<sup>d</sup> Thermometer 68°—the river for several nights  
 past has fallen about 3 inches perpendicular  
 each night: observed a great number of muscles  
 and periwinkles along shore: the muscle is of  
 the kind commonly called pearl-muscle, & by  
 means of its long tongue makes considerable  
 progress along the bottom & upon the beaches  
 of the river when under water: our people had  
 a quantity of them dressed and found them to  
 be agreeable food: to me they were tough and  
 unpalatable.

unpalatable. The wind altho' a head but not strong, we got along pretty well; but towards 11<sup>h</sup> a. m. it became much stronger, and we made little way. Notwithstanding the cloudy state of the atmosphere we were fortunate in getting a good meridian observation, by which it appears we were in Lat:  $30^{\circ} 36' 29''$  nearly 3 miles higher than the town of Natchez: after dinner proceeded to the mouth of the Catahoola on the left and landed to get information from a french man settled here: he has a grant of land from the Spanish government, has made a small settlement and keeps a ferry-boat for crossing men & horses traveling to or from Natchez and the settlements on red river and on the Washita river: the Country here is all alluvial; in process of time the rivers shutting up ancient passages & elevating the banks over which their waters pass, no longer communicate with the same facility as formerly; the consequence of which naturally is that many large tracts formerly subject to annual inundation are now entirely exempt from that inconvenience: such is the situation of a most valuable tract upon which this french man is settled: his house is placed upon an Indian mount with several others in view: there is also a species of rampart surrounding this place & one very elevated mount; all of which I propose to view and describe on my return, our situation not now admitting

1804 } admitting delay: the soil here is equal to the  
 October } best Mississippi bottoms; the proprietor says the  
 high mount is not less than 80 feet perpendicular, of this we shall form some estimate at our  
 return. We obtained from him the following  
 list of distances from the mouth of the red river  
 to the Post on the Washita called Fort Miro.

From the mouth of Red river to the mouth of black river . . . . .	10 Leagues
To the mouths of Catahoola, Washita & Tenza . . . . .	22
To the River Ha-ha on the right . . . . .	1
To the Prairie de Villemont on the same . . . . .	5
To Bayoo Louis on the same — rapids here . . . . .	1
To Bayoo Bocufs on the same . . . . .	4
To the Prairie Noyée (drowned Savannah) . . . . .	3
To Pine point on the left . . . . .	4½
To the Bayoo Calumet . . . . .	3½
To the Coal mine on the right & Gypsum on the opposite shore . . . . .	3
To the 1 <sup>st</sup> Settlement . . . . .	12
To Fort Miro . . . . .	22
<hr/>	
Leagues	91.

The accounts of the low state of the river we receive here are rather discouraging, as it appears, that on the first rapids, seven leagues distant there are only 22 inches of water, and we now draw at the stern 30 inches or more.— Went on and encamped within the mouth of the river Washita. This river derives its appellation from the name of an Indian tribe formerly

merly resident on its banks, but now no more 1804  
October to be found; it is said that the remnant of the nation went into the great planes to the westward & either compose a small tribe themselves, or are incorporated into another nation. The Junction of the Washita with the Tenza and the Catahoola a little below, all together form the black river, which last here, loses its name, altho' our maps represent it as taking place of the Washita: the Tenza and Catahoola are also names of ancient tribes now extinct: the latter is now the name of a Creek or bayoo 12 leagues long, which is the issue of a lake of the same name 8 leagues in length & 2 leagues generally in breadth, it lies west of this place & communicates with the Red river during the time of the great annual inundation; it receives at the West or N.W. angle a Creek called little river, which preserves a channel with running water at all seasons, meandering along the bed of the lake; but all other parts of its superficies during the dry season from July to November & often latter, are completely drained & become clothed in the most luxuriant herbage: the bed of the Lake then becomes the residence of immense herds of Deer, of Turkeys, Geese, Ducks, Cranes &c &c feeding upon the grass and grain; the Duck species being generally found on or near the little river. The Bayoo Tenza serves only to drain off a part of the waters of the inundation

1804 } inundation from the Mississippi low lands which  
 October } here communicate with the black river during  
 the season of high waters. By reference to our  
 Latitude at Noon we find the mouth of the  
 Washita to be in Lat:  $31^{\circ} 37' 57''$  — Extremes  
 of the thermometer  $68^{\circ}$ — $73^{\circ}$ . Sounded — found  
 6 fathoms — muddy bottom. Made this day 9  
 miles  $77\frac{1}{4}$  perches.

Wednesday 24<sup>th</sup>: Thermometer before sun-rise  $54^{\circ}$  — Wind  
 North — Cloudy — Temperature of the river  
 water  $71^{\circ}$  No current to impede our progress  
 worth estimating. Made slow advancement as  
 usual with our oars; found the shore favorable  
 for tracking or towing, which mode we con-  
 tinued nearly all day making at the rate of five  
 perches p:  $\frac{1}{2}$  minute, which is about half a  
 perch more than by rowing: a boat properly  
 constructed for an expedition of this nature  
 ought to advance with more than double our  
 velocity. The wind was contrary all day other-  
 wise we might have gone at the rate of 6  
 perches which is equal to  $2\frac{1}{4}$  miles per hour,  
 more might be performed, but our Soldiers seem  
 at certain times to be without vigour & now  
 and then throw out hints that they can work  
 only as they are paid.

The high lands on both sides have now the  
 appearance of being above the inundation; the  
 timber is such as is generally produced upon  
 high

high lands chiefly Oaks, red, white & black; interspersed with a variety of others; the magnolio *grandiflora* is absent; its presence is an infallible sign of lands not subject to inundation. { 1804  
October  
We observed to day along the banks the strata of solid clay or marl (not recent but apparently ancient) to lie in very oblique positions, some making an angle of nearly  $30^{\circ}$  with the horizon & generally inclined with the descent of the river, altho' in a few cases the position was contrary; timber was also seen projecting from under the solid bank, which last seems to be in some measure indurated; it is unquestionably very ancient presenting a very different appearance from the recently formed soil: the river is here about 80 yards wide. The Bayoo Ha-ha comes in unexpectedly from the right about a league above the mouth of the Washita, and is one of the many passages or issues thro' which the waters of the great inundation penetrate & pervade all the low countries, annihilating for a time the currents of the lesser rivers in the neighbourhood of the mississippi. Vegetation is extremely vigourous along the alluvial banks; the twining vines entangle the branches of the trees & expand themselves along the margin of the river, in the richest and most luxuriant festoons, and often present for a great extent a species of impenetrable Curtain varigated and spangled with all possible gradations of Color  
from

1804 } from the splendid orange to the enlivening green  
 October } down to the purple & blue and interwoven with  
 bright red and russet brown. A carpet of the  
 finest shrubbery overspreads the elevated margin,  
 composed of a variety of elegant vegetables, to  
 many of which probably no names have yet  
 been assigned by the Botanist; and in positions  
 where the shade is not too deep, the surface is  
 enameled with thousands of humbler plants in  
 full blossom at this late season.

The day has continued cloudy but begins to  
 clear away about 11<sup>h</sup> a.m. we therefore landed  
 before noon to observe & found our Latitude to  
 be  $31^{\circ} 42' 30''.5$  — The timber of the higher  
 grounds is still remarked to be inferior in size  
 and height to that on the Mississippi; but here  
 it may be accounted for by a less fertile soil, not  
 apparently (at most rarely) subject to inundation.  
 The wind still continues in the N. or N.N.W.  
 but the clouds are disipating and tomorrow we  
 expect fair weather, for making observations.  
 Extremes of the thermometer  $54^{\circ}$ — $68^{\circ}$ . En-  
 camped after completing a poor days voyage  
 of 14 miles 48 perches. Therm: at 8<sup>h</sup> p.m.  
 $54^{\circ}$  —

Thursday 25<sup>th</sup> Therm: in air  $49^{\circ}$  — in river water  $68^{\circ}$ . Wind  
 north. Cloudy. Continued & passed Villemont's  
 prairie on the right & pine point opposite: the  
 prairie obtained its name in consequence of its  
 being

being included within a grant under the french Government to a gentleman of that name ; some of the family & name yet remain at New Orleans but I have not heard of any claim for this land ; many other parts of the Washita are named after their early proprietors : the french people projected & began extensive settlements upon this river, but the general massacre planned & in part executed by the Indians against the french, and the consequent massacre of the Natchez tribe by the french, broke up all those undertakings & they were not re-commenced under the french government. Those prairies are planes or savannahs without timber, generally very fertile, producing an exuberance of strong thick and coarse herbage. When a piece of ground is once got into this state in an indian country, it can have no opportunity of re-producing timber ; it being an invariable rule to fire the dry grass in the Fall or winter, to obtain the advantage of attracting game when the young tender grass begins to spring ; & thus the young timber is destroyed, & annually the prairie gains upon the wood land ; it is probable that the immense planes known to exist in America may owe their origin to this practize. The planes of the Washita lie chiefly on the East side, & being generally formed like the Mississippi lands sloping from the bank of the river towards the great river, they are more or less liable to the influence of inundation

1804 } inundation in the rear, which has been known  
 October } to advance so far in certain great floods, as to be  
 ready to pour over the margin into the Washita  
 river ; this however has now become a very rare  
 case & it may generally be estimated that from  
 $\frac{1}{4}$  mile to a whole mile in depth will remain  
 exempt from inundation during high floods :  
 and this is pretty much the Case with those  
 lands nearly as high as the Post of the Washita,  
 with the exception of certain ridges of primitive  
 high land ; the rest being evidently alluvial,  
 altho' not now subject to be inundated by the  
 Washita river, (which has originally caused their  
 formation), in consequence of the great depth,  
 which the bed of the river has acquired by  
 abrasion.

We saw a good deal of high land to day on either bank producing pine and other timber not the growth of inundated lands. About a league beyond Pine point we arrived at Bayoo Louis on the right, being the commencement of the rapids or rather shallows: Sent people into the water to search the best channel, and after being frequently aground and dragging the boat we got up into a situation about a mile higher, where we were in a manner embayed, being shut in by a gravel-bar upon which there was scarsely in the deepest part a foot of water : finding the men fatigued by being so much in the water at hard labor, we thought it best to

rest

rest for the remainder of the day and consult { 1804  
upon what was best to be done.—The bar be- } October  
ing of inconsiderable breadth & no rock in the  
bottom as we had been taught to expect, it  
was thought best to cut a channel sufficient for  
the passage of the boat, which we supposed  
would take less time than unloading, transport-  
ing & reloading at a considerable distance from  
our present station.—The weather continued  
damp and disagreeably cold all day: we had no  
observation at noon. Extremes of the Therm:  
49°—60° Wind at North. Clearing up—many  
stars to be seen in the evening: made 3 miles  
120 perches.

Thermom' in air 40° in river water 65°.— Friday 26<sup>th</sup>  
Wind N.W. light clouds. The morning being  
very cool, it was thought best for the people to  
take an early breakfast before going into the  
water to work. After breakfast commenced dig-  
ging the cannal which was required to be about  
an hundred feet long: this business went on hea-  
vily & slowly as usual, and it was not until noon  
that it was made barely of the depth which it  
was supposed might pass the boat.

The day being fine made some observations  
for the regulation of the watch & for the mag-  
netic variation, and at noon had a fine observa-  
tion, from which the Latitude of this remarkable  
place was ascertained to be  $31^{\circ} 48' 57''$  .5 — a  
little

1804 } little way up the river  $\frac{1}{4}$  of a mile there is a  
 October } high ridge of primitive earth studded with an  
 abundance of fragments of rock or stone, which  
 appears to have been thrown up to the surface  
 in a very irregular manner, the stone is of a fri-  
 able nature, & some of it has the appearance  
 of indurated clay; without it is blackish from  
 being exposed to the air, and within of a grey-  
 ish white: it is said that within the hill, the  
 strata are regular, & that good grind-stones may  
 be obtained. After dinner the boat was moved  
 into the channel, where she stuck fast. Cables,  
 ropes and pulies were got across and fixed to  
 trees: handspokes were used to raise & push  
 her along and we made some way thro' the bar,  
 but evening coming on we were obliged to de-  
 sist in hopes of being able to get over in the  
 morning. Extremes of the thermom<sup>1</sup> 40°-70°.  
 Wind N.W. Clear star light. Discovered a barge  
 coming up behind us; she also grounded & sent  
 her people out to search for the channel.

Saturday 27<sup>th</sup> Thermometer in air 32° in river water 64°  
 Wind N. Clear above. A fog upon the river,  
 occasioned by the condensation of vapor arising  
 from the surface of the river: the morning be-  
 ing very cold with a hoar-frost, the people were  
 directed to get their breakfasts and prepare to  
 use their exertions in getting the boat over the  
 shoal; the day proved very fine with an agree-  
 able

able warm sunshine, but it was 1<sup>h</sup> p.m. before we got entirely over into floating water on the opposite shore, the men having upon this occasion exerted themselves to my entire satisfaction. The occupation of this day prevented us from making any astronomical observations.— After dinner we pushed on and arrived at the last of the rapids at this place ; here we found a ledge of rocks across the entire bed of the river, but having previously sounded and discovered the best channel, we got over into deep water after grounding and rubbing two or three times : The river became again like a mill-pond without current, excepting a motion barely perceptible along the concave shore, the velocity was nevertheless very considerable upon the shoals where the depth of water was small. The whole of those first shoals or rapids embraced an extent of 1½ miles ; that is, the obstruction was not continual, but felt at short intervals along this space : Encamped about 1½ mile above the last rapid. Extremes of the therm: 32°-73° The evening proves fine & mild. Therm: at 8<sup>h</sup> p.m. 62° Wind North. High pine land on the right — breadth of the river 100 yards.

Thermometer in air 40° — in river water 63° Sunday 28<sup>th</sup>  
 — Wind N.W. Clear — fog on the river. Continued our voyage & made some observations for the Longitude & magnetic variation at the hour of

1804 } of breakfast. High lands and a large Savannah  
 October } seen on the right in the morning passed a rocky  
 hill soon after and ' Bayou aux bœufs ' on the  
 right about 4 leagues from the rapids. At noon  
 got a good observation, Latitude deduced  $31^{\circ} 53'$   
 $35''$ .5 — at 3<sup>h</sup> p.m. the thermom<sup>t</sup> was at  $78^{\circ}$  in  
 the shade; the day was warm and the sun power-  
 ful: observed some more planes to the left: the  
 river made several returning courses to day, to  
 the southward of west. Thermom<sup>t</sup> at 8<sup>h</sup> p.m.  $56^{\circ}$   
 — Extremes  $40^{\circ}$ — $73^{\circ}$  Sounded — 3 fathoms —  
 mud & sand. Made this day 12 miles 116 perches.

Monday 29<sup>th</sup> Thermom<sup>t</sup> in air  $41^{\circ}$  in river water  $62^{\circ}$  Wind  
 N.W. Fog on the river. Continued our voyage  
 — The banks of the river seem to retain very  
 little alluvial soil; on the opposite shores we see  
 frequently to the water's edge the high land  
 earth, which is a sandy loam of a greyish light  
 color with streaks of red sand & clay; the soil  
 is not rich, bearing great numbers of pines, in-  
 terspersed with red oak, hickory and dog-wood.  
 The river is now from 60 to 100 yards wide.  
 At the hour of breakfast made three lunar ob-  
 servations, and one sun's altitude to regulate the  
 watch, which with the observations of yester-  
 day will give the rate of going of the watch  
 proportioning for change of Latitude and de-  
 parture as we advance in the progress of our  
 voyage; I do not however think it of much  
 importance

importance to regard those observations untill we arrive at the post of Washita, which I suppose to be nearly the most easterly point of the river ; there and at the hot-springs (the most westerly point we shall visit) we shall take time to make correct observations ; all other points of the river will be ascertained with sufficient precision from our geometrical survey so frequently corrected by the Latitude. At Noon we found our Latitude to be  $31^{\circ} 58' 2''$ . Having made some advantageous alterations in the arrangement of our benches and oars, we advanced with a little better speed ; about 6 perches p<sup>r</sup>  $\frac{1}{2}$  minute which however does not exceed  $2\frac{1}{4}$  miles p<sup>r</sup> hour in water without any sensible opposition from the Current. The wind came about to S.W. in the evening ; Therm<sup>m</sup> at 8<sup>h</sup> p.m.  $62^{\circ}$  Extremes  $41^{\circ}$ — $85^{\circ}$ . Soundings — 3 fathoms mud & sand — made this day 14 miles 65 perches.

Thermom<sup>m</sup> in air  $47^{\circ}$  in river water  $60^{\circ}$  Wind Tuesday 30<sup>th</sup> W.N.W. Fog on the river. Clear above.—Continued our voyage : the land on either bank seems to be from 30 to 40 feet high and does not improve in quality : pine-trees seen in most situations — nothing remarkable occurred except a rapid we passed in the afternoon, formed by a ledge of rocks which traversed the river, narrowing the water channel to about 30 yards, but the extent between the high banks was not less

1804 } less than a hundred. At noon found the Latitude  
 October } to be  $30^{\circ} 5' 24''$ . It would appear from the distances run by our Log and time, when compared with the estimated distances by the french inhabitants and hunters, that their league scarcely exceeds two miles. Encamped near a sand beach favorable for hauling the sene & catched a sufficiency of fish to serve all the people for supper and breakfast. Therm: at 8<sup>h</sup> p.m. 60° Extremes 47°-83° Made this day 15 miles, 150 perches.

Wednesday 31<sup>st</sup> Thermom: in air 44° in river water 62° Wind N.N.W. Clear — fog on the river — Continued our voyage. This morning met with shallow water & strong currents, our rate of going, deducting the velocity of the stream was reduced to 2 perches : got upon shoals about 8<sup>h</sup> a.m. which detained us greatly, and impeded us more or less untill the afternoon ; at noon we had a good observation ; Lat: found  $32^{\circ} 10' 13''$  — at 2<sup>h</sup> p.m. got over the last shoal for this day & went on in good water untill the evening, the channel was very narrow, the sand bars at every point extending so far into the bend as to leave little more than the breadth of the boat of water sufficiently deep for her passage, altho' the water often covered a breadth of 70 to 80 yards upon the shoal : in the afternoon passed a little plantation or settlement on the right and at night came up with three others joining each other :  
 here

here is a plane or prairie upon which those settlements are placed; from the regular slope of the land from the river bank towards the eastward, we may be assured the soil is alluvial, yet the bed of the river is now so deep that it is no longer subject to that inconvenience, but in the rear the Mississippi advances & sometimes leaves dry but a narrow stripe along the banks, it is however now more common that the extent of the fields cultivated (from  $\frac{1}{4}$  to  $\frac{1}{2}$  mile) remain dry during the season of the inundation: the soil here is very good but not equal to mississippi bottoms; it may be esteemed second rate. At a small distance to the East are extensive Cypress swamps, over which the waters of the inundation always stand to the depth of 15, 20 & 25 feet. On the west side after passing over the Valley of the river, whose breadth is various from  $\frac{1}{4}$  to 2 miles or more, the Land assumes a considerable elevation from 100 to 300 feet and extends all along to the settlements on the Red river; those high lands from report are poor & badly watered, being chiefly what is termed a pine-barren: there is here a ferry & a road of Communication between the Post of the Washita and the Natchez & a fork of this road passes on to the Settlement called the rapids on Red river, it is distant from this place by computation 150 miles.

From the experience we have had of this  
river

1804 } river and the information obtained, it appears  
October } that the present is the least favorable season for  
ascending this river with a boat of so consider-  
able a draught of water as ours; the spring of  
the year is the most advantageous, the Mississippi  
then flows up into the beds of the inferior rivers,  
raising their waters sometimes within a few feet  
of the top of the banks; the small current is  
then often in favor of the ascending boat: this  
objection would vanish if light boats were used  
drawing only 6 or 8 inches of water & if well  
constructed might make with ease 12 leagues  
or even 40 miles p<sup>r</sup> day; such ought to be the  
kind of boats for an expedition fitted out to  
explore; as little time as possible ought to be  
lost in moving, that more may be left for obser-  
vation and research: in our actual situation our  
dayly progress seldom equals 14 or 15 miles,  
which is a sad drawback upon the accomplish-  
ment of the objects of an exploring expedition.  
On this part of the river lies a considerable grant  
of Land conceded by the Spanish Government  
to the Marquis of Maison rouge a french emi-  
grant, who bequeathed it with all his property  
to M. Bouligny son of the late Colonel of the  
Louisiana regiment & by him sold to Daniel  
Clark; it is said to extend from the post of the  
Washita with a breadth of two leagues includ-  
ing the river down to the bayou Calumet, the  
computed distance of which along the river is  
called

called 30 leagues, but said to be not more than 12 in a direct line. Extremes of the thermom:  $44^{\circ}$ – $84^{\circ}$  Made this day 6 miles 165 perches.

Thermom: in air  $48^{\circ}$  in river water  $62^{\circ}$  — { November  
Calm — clear above, a little fog on the river. { Thursday 1<sup>st</sup>  
Having sounded last evening a shoal upon  
which there is 18 inches water in the deepest  
place, we prepared, by unloading part of our  
Cargo, to cross it: we obtained the use of two  
Canoes, which with a good deal of trouble  
enabled us to get over about noon: finding a Ca-  
noe so useful & being informed of other rapids  
and shoals before us, we bartered away a smaller  
canoe with a little cash for the larger of the  
two we had borrowed, proposing to put two  
of our best hunters into the empty Canoe by  
which they might keep a head & procure some  
game, & be ready on all emergencies to assist the  
Barge. Dined & continued our voyage; met  
with several retardments from shoals. Made  
only 4 miles 115 perches. Extremes of the  
thermom:  $48^{\circ}$ – $85^{\circ}$  at 8<sup>h</sup> p.m.  $64^{\circ}$  Weather ex-  
tremely fine & agreeable, the slow progress of  
our boat being the only circumstance of regret,  
as tending to disappoint our prospects.

Thermom: in air  $48^{\circ}$  in river water  $62^{\circ}$  light Friday 2<sup>d</sup>  
clouds — Wind S.S.E. a little fog on the river. —  
Continued our voyage with immense sand bars  
in

1804 } in view at every point : the utmost care in steer-  
 November } ing was necessary to keep clear of shoals and  
 sunken logs, which latter were frequently very  
 embarrassing : we suffered much detention this  
 day from those causes, being twice fast upon  
 a sunken log under water, and our boat being  
 so unwieldy & heavy, there was no getting her  
 off by any exertion of poles &c which could  
 be made on board, a rope was carried ashore  
 from the stern, & by that means she was hove  
 backwards & cleared of the log : we lost 1½  
 hour each time by two such accidents, & sev-  
 eral times got upon shoals which delayed us  
 greatly : light flat boats proper for the nava-  
 gation of shallow waters would pass over all such  
 obstacles without touching, & when they do  
 touch, being light, they are easily pushed back ;  
 external keels are very improper for any boat  
 upon the mississippi or any river where logs are  
 to be encountered : our boat to her other in-  
 conveniences was provided with a keel, which  
 added to her draught of water, made her much  
 more difficult to get over a log or shoal, it being  
 impossible to clear her by pushing latterally.  
 Therm: at 8<sup>h</sup> p.m. 78° Extremes 48°-84° Made  
 this day 8 miles 104 perches.

Saturday 3<sup>d</sup> Therm: in air 52° in river water 64° Some  
 light clouds. Continued our voyage with very  
 little variety, a great sameness appears as to the  
 river

river and its banks. Altho' we got several times { 1804  
aground we were not so unfortunate as yester- { November  
day; immense sand bars or beaches with steep  
banks on the opposite shore continued to be the  
objects of our view, very little alluvial land ex-  
cept at some points opposed to Cliffs, was to be  
seen: along the margin of the river, many hum-  
ble plants are to be seen in flower at this late  
season, altho' the leaf falls from the trees of the  
forest: the great variety of tints which the foli-  
age assumes before it separates finally from the  
parent stock, presents to the Eye an infinitude of  
beautiful landscapes, and if critically examined  
is perhaps not without its use: it will be found  
that the leaves of the same tree are all changed  
to the same Color, which is probably occasioned  
by the oxigen of the atmosphere acting upon  
vegetable matter deprived of the protecting  
power of its vital principle, & thereby calls forth  
its latent colorific properties: I have always  
remarked that the leaves of such trees whose  
barks and woods are known to produce a dye, are  
changed in autumn to the same Colour, which  
is extracted in the Dyer's vat from the woods  
more especially by the use of alum or other  
mordant; whose predominant principle yields  
oxigen: thus the foliage of the hickory & the  
oak yielding the quercitron bark is changed  
before its fall to a beautiful yellow; other oaks  
assume a fawn colour, a liver or blood colour,  
and

1804 } and are also known to yield dyes of the same  
 November } complexion : I am persuaded from the few ob-  
 servations I have made that this rule will be  
 found general, and may therefore serve as an  
 excellent guide to the Naturalist who directs  
 his researches to the discovery of new objects  
 for the use of the Dyer.

At noon we found ourselves in Latitude  $32^{\circ} 17' 17''$  — nothing remarkable occurred in the afternoon, except a discovery made by Dr Hunter (walking along the river side) of a substance resembling mineral Coal : I suppose from its appearance, that it is the Carbonated wood described by Kirwan and other Chemists : some specimens were preserved ; it does not easily burn, but on being applied to the flame of a candle, it seemed to encrease it & yielded a faint smell resembling, in a slight degree that of the gum-lack of common sealing wax. In the evening passed over some rapids and shoals ; bottom stone & gravel. Thermom<sup>t</sup> at 8<sup>h</sup> p.m.  $72^{\circ}$ . Extremes  $52^{\circ}$ — $86^{\circ}$ . Made this day 11 miles 140 perches.

Sunday 4<sup>th</sup>. Thermom<sup>t</sup> in air  $54^{\circ}$  in river water  $64^{\circ}$ . Clear. This has been an unfortunate day ; the morning and afternoon were spent upon shoals and rapids with stoney & gravelly bottoms, the Men having been a great part of the time in the water. Got a good observation at noon ; Latitude found

$32^{\circ}$

32° 21' 10". Made only 4 miles 233 perches. { 1804  
 Thermom: at 8<sup>h</sup> p.m. 63° Extremes 54°-83. { November

Therm: in air 52° in river water 62° heavy Monday 5<sup>th</sup>  
 fog & damp air. We were obliged this morning  
 to take out part of our loading to enable us to  
 pass over a shoal carrying only 18 inches water,  
 which detained us untill near 10<sup>h</sup> a.m.— In the  
 course of the day got upon several shoals of in-  
 ferior note, but upon the whole we were more  
 fortunate than usual, the water being generally  
 deeper and with little current. We remarked a  
 greater appearance of fertility as we approached  
 the Settlement; the trees are of larger dimen-  
 sions, & there is a due proportion of shrub or  
 underwood, which was absent in the poorer  
 lands; some fields of Cane began to appear,  
 which is a sure indication of a fertile soil: we  
 had also leisure to admire the beautiful tints  
 assumed by the foliage of the vegitable world:  
 it was apparent that the external leaves most  
 exposed to the light & to a freer circulation of  
 air, exhibited the first changes of Color, while  
 those of the same plant under a thick shade still  
 retained their deep verdure. The Willow tree  
 pendent over the water, presents a fine deep yel-  
 low along the outline of the plant, from whence  
 may be traced a regular gradation, thro' the ad-  
 mired lemon color down to the soft and delicate  
 summer's green, which last in the shade, retains  
 its

1804 } its full verdure: on other trees may be seen a  
 November } deep blood color inclining to black, descending  
 by regular shades to the palest pink mingled  
 with green & from thence by similar gradation  
 to the usual summer verdure of the plant: Leaves  
 plucked from the tree at this season & preserved  
 in the shade will retain their beautiful colors for  
 a great length of time.

The river continues of the same general breadth. i. e. from 80 to 100 yards, but the water channel is often confined to 30 yards. The Atmosphere had this day a smokey or misty appearance; the Sun broke forth a little in the afternoon, but shone with diminished lusture. This smokey or misty appearance which in our Country is common in the months of November and December is attributed to a common practize of the Indians and Hunters, of firing the woods, planes or savannahs; the flames often extending themselves some hundred of miles, before the fire is extinguished; it is observed that rain always follows those conflagrations; sometimes the condensation of the smoke occasions a fine rain resembling a fog or thick dew, but at other times the rain is impetuous accompanied by thunder & lightening & immediately after it clears up fine, but not always without a continuation of the blue misty appearance of the Atmosphere.

Soft friable stone is frequently seen and great loads

loads of gravel and sand upon the beaches ; red- { 1804  
 dish Clay appears in strata much indurated and { November  
 blackened by exposure to light and air. — The  
 water of this river is extremely agreeable to  
 drink and much clearer than that of the Ohio ;  
 in this respect it is very unlike its two neigh-  
 bours the arcansa and red rivers ; whose waters  
 are extremely charged with earthy matter of  
 a reddish brown color, giving to the water a  
 chocolate-like appearance ; & when those rivers  
 are low their waters are not potable, being ex-  
 tremely brakish, from the great number of salt  
 springs flowing into them & very probably from  
 the beds of rock-salt over which, (it has been  
 reported) they flow : the inconvenience from this  
 cause, to voyagers, is not so great as might be  
 apprehended, as it appears that brooks & springs  
 of fine water falling into those rivers, particu-  
 larly the arcansa, are very frequent, and may be  
 met with often in the course of a days progress.  
 — Altho' the water of the Washita river does  
 not exhibit any saline impregnation, yet from  
 report there are many situations in its neigh-  
 bourhood where salt may be procured by dig-  
 ging pits in the places called salt-licks, where  
 water is found equally strong with sea-water ; we  
 expect to examine some of those on our way  
 upwards. Thermom<sup>!</sup> at 8<sup>h</sup> p.m. 58° Extremes  
 52°-68° Wind at N.W. Made this day 11 miles  
 276 perches.

Thermom<sup>!</sup>

1804  
November  
Tuesday  
6<sup>th</sup>

Thermom<sup>r</sup> 45° in air — in river water 64° —  
heavy fog Wind W. Continued our voyage with  
better fortune ; that is, we escaped any consider-  
able obstructions from rapids and sand bars.  
No variety was to be seen in the appearance of  
the Country on either side the river. At noon  
got a fine observation about a league below the  
Post of Washita ; Latitude deduced 32° 28' 58" ;  
by the sinuosities of the river it appears we are  
not more than a mile to the south of it : arrived  
there about 3½<sup>h</sup> p.m. and were very politely  
received by Lieu<sup>t</sup> Bowmar, who immediately  
offered us the hospitality of his Dwelling with  
all the services in his power. The Position called  
Fort Miro being the property of a private per-  
son, who was formerly civil commandant here,  
the Lieutenant has taken post about 400 yards  
lower and has built himself some log-houses and  
enclosed them with a slight stockade : this young  
officer exclusive of the manners of a polite Gen-  
tleman, appears to possess talents ; he has formed  
a tollerably good chart of the river from its  
mouth to the Post, being the result of his own  
labors on the way up to take possession of the  
Post, this he has continued upwards from the  
best information he has been able to obtain ;  
the whole gives a satisfactory idea of the river  
& part of the Country ; we have also obtained  
some further information from the former Com-  
mandant a french man, and other persons here,  
of

of all which we have made notes & shall avail ourselves in the prosecution of our voyage.  $\left\{ \begin{array}{l} 1804 \\ \text{November} \end{array} \right.$

Thermom: at 8<sup>h</sup> p.m. Extremes 45°-79° Made this day 9 miles 257 perches; amounting in the whole to 196 miles 256 perches from the mouth of the red river to the Post of the Washita ; and by the old computation 90 leagues.

Thermometer in air 52° in river water 64° Wednesday 7<sup>th</sup>  
 Clear. Finding from past experience that the boat in which we have come up, would be improper for the continuation of our voyage, we made enquiry this morning for other craft, but it appears there is no great choice of boats at this place ; prepared also for astronomical observation : being greatly interrupted by visitants who came to offer services &c we were prevented from making any useful observation until noon & even then we were incommodeed : the Sun's meridian altitude gave the Lat: 32° 29' 52".5 but I was not perfectly satisfied with this observation ; from the Causes mentioned I suspect the altitude was taken a little too late, & shall hope to correct if necessary by future observations. Therm: at 8<sup>h</sup> p.m. 67° Extremes 52°-80°

Thermom: in air 53° in river water 58° Thursday 8<sup>th</sup>  
 Cloudy. This was a disagreeable, damp and cold day : made further enquiry for small boats with little

1804 } November } little success; found only one, which with another of the same burthen might answer our purpose: no observation made this day. Upon viewing the Country on the East of the river, it is evidently alluvial; the surface is equal with a gentle slope from the river towards the rear of the plantations; the land here is of excellent quality, being a rich black mold to the depth of a foot, under which there is a friable loam of a brownish liver color, which very probably will itself become a good soil when broken up & exposed to the influences of the elements. Therm: at 8<sup>h</sup> p.m. 56° Extremes 53°-61°

Friday 9<sup>th</sup> Thermom: in air 42° in river water 61° Cloudy, damp & cold. Continued our search for proper vessels and heard of a flat-bottomed barge, which we expect will be very suitable, with the reduced loading we intend to carry with us, the boat will probably draw only 12 inches water: no observation, it being dark, cloudy & disagreeable all day. Extremes of the thermometer 42°-72°

Saturday 10<sup>th</sup> Thermom: in air 40° in river water 58° Clear—calm—this day having the appearance of being fine & serene, prepared for observation; and in the course of the day took altitudes of the Sun for the regulation of the watch and the magnetic variation: at noon found the Latitude by

by a fine observation to be  $32^{\circ} 29' 35''$ , this differs from that of the 7<sup>th</sup> by  $17''$ ; I give the preference to the result of this day, for reasons already mentioned; In the afternoon took distances of the moon from the Sun to the west of her and in the evening took distances of the moon from  $\alpha$  Arietis to the east of her, which may be considered as a complete series for the determination of the Longitude.

Having hired the barge and agreed to give  $1\frac{1}{4}$  dollar p<sup>r</sup> day for the use of her, we had her brought along side: She is upwards of 50 feet long &  $8\frac{1}{2}$  feet in breadth built tollerably flat, her bottom being still a little convex & being pretty well formed for running. This boat with some improvements is probably the best form for penetrating up shallow rivers, she is undoubtedly too long, as we shall certainly meet with short turns among logs & perhaps rocks, the passage of which might be facilitated by a shorter boat: got her loaded before the evening with a view to set off early next morning. She made some water—found about bed time, that she had made a great deal of water; kept her baled all night. Thermom<sup>r</sup> at 8<sup>h</sup> p.m.  $34^{\circ}$  Extremes  $40^{\circ}$ — $72^{\circ}$

Thermometer in air  $24^{\circ}$  in river water  $53^{\circ}$  Sunday 11<sup>th</sup>  
Clear — calm.— Got the Barge hauled ashore  
and caulked, which detained us untill the after-  
noon ;

1804 }  
 November } noon ; got another good observation at noon,  
 which gives the latitude  $32^{\circ} 29' 30''.5$  that is  
 $4\frac{1}{2}''$  less than yesterday, and as those two obser-  
 vations were both very good, the mean of the two  
 results may be taken for the truth, the latitude  
 of the place of observation will therefore be  $32^{\circ}$   
 $29' 32''.75$  and as the post or Garrison lies  $4\frac{1}{2}''$   
 north of the place of observation, we may con-  
 sider its latitude as fixed at  $32^{\circ} 29' 37''.25$ . Set  
 out after dinner and made 3 miles, Encamped at  
 the plantation of Baron Bastrop. It appears that  
 this small settlement on the Washita & some of  
 the Creeks falling into it contains only 500 per-  
 sons of all ages & sexes ; it is reported that there  
 is a great deal of excellent land upon several  
 considerable Creeks falling into the Washita &  
 that consequently the Settlement is capable of  
 great extension, & may be expected, with an  
 accession of population to become very flourish-  
 ing : there are three merchants settled at the  
 post, who supply the inhabitants at very exor-  
 bitant prices with their necessaries ; those with  
 the garrison & two small planters and a trades-  
 man or two constitute the present village : a  
 great part of the inhabitants still continue the  
 old practize of hunting during the winter sea-  
 son ; their peltries go to the Merchant at a low  
 rate in exchange for necessaries ; in the summer  
 these people content themselves with making  
 corn barely sufficient for bread during the year ;  
 in

in this manner they always remain extremely poor; some few who have conquered their habits of indolence (which are always a consequence of the indian mode of life) and addicted themselves to agriculture, live more comfortably & taste a little the sweets of civilized life.

Thermom<sup>t</sup> in air  $36^{\circ}$  — in river water  $54^{\circ}$  — Monday the 12<sup>th</sup>  
 Clear — Calm — Got on board some fresh beef and other provisions this morning, which detained us a little. Continued our voyage with a pilot on board hired at the rate of 30 dollars p<sup>r</sup> month. Met with several shoals, but passed over them with ease, our Barge not drawing half the water of our own boat, & being also very light both in her timbers & planks; the appearance of the lands along the river is not very inviting, much pine woods upon a thin poor soil: to the right the settlements on the Bayou Barthelmi and Siard are said to be rich lands. At noon got an observation; Latitude  $32^{\circ} 34' 47''$ . Made this day 16 miles 32 perches. Therm<sup>t</sup> at 8<sup>h</sup> p.m.  $54^{\circ}$  — This Evening a little Cloudy.

Thermom<sup>t</sup> in air  $33^{\circ}$  in river water  $55^{\circ}$  Fog Tuesday 13<sup>th</sup> on the river. Calm. Continued our voyage without change in the appearance of the Country: passed an Island and strong rapid at 8<sup>h</sup> a.m. & arrived at a little settlement where we halted to breakfast a little below a chain of rocks crossing

1804 }  
 November } ing the channel between an Island & the main-  
 land called Roquerau — great misery depicted  
 in the Countenances of the Spaniard & his  
 family inhabiting this little settlement, arising  
 as it appears from extreme indolence: the wind  
 at south indicates rain, with a dark cloudy sky:  
 we find our situation greatly improved in our  
 new barge, being able to go about 3 miles p:  
 hour when the Men use a little exertion: we  
 pass without difficulty over shoals of 11 or 12  
 inches water. The river acquires a more spacious  
 appearance, being in most places about 150 yards  
 wide. Lost some time on the shoals and at half  
 an hour past noon arrived at the last settlements.  
 Began to rain — put ashore to dine — cleared up  
 — set out and passed the mouth of Bayou Barthelmi on the right at 4<sup>h</sup> p.m. being 12 com-  
 puted leagues from the post. Here commences  
 Baron Bastrop's great grant of land from the  
 Spanish Government, being a square of twelve  
 leagues to each side; a little exceeding one mil-  
 lion of french acres, which I presume is more  
 than double of what that Government granted  
 to all persons within the Mississippi territory.—  
 At 11<sup>h</sup> a.m. passed Otter Bayou on the left. The  
 Banks of the river continue to be about 30 feet  
 high, of which 18 feet from the water are a  
 clayey loam of a pale ash colour, upon which  
 the river has deposited an alluvion of 12 feet of  
 light sandy soil, which appears in most places  
 to

to be fertile, being of a brownish dark color. { 1804  
 It seems that this species of land is here of small { November  
 breadth, not exceeding half a mile on each side,  
 & may be called the valley of the river Washita,  
 beyond which there is high land clothed chiefly  
 with pines.—The Evening is cloudy & dark.  
 Made this day 16 miles 312 perches — Ther-  
 mom<sup>it</sup> at 8<sup>h</sup> p.m. 62° — Extremes 33°—66°

Thermometer in air 44° in river water 55° — Wednesday 14<sup>th</sup>  
 Clear—calm. Continued our voyage, the soil  
 seems to be thin; the growth of the timber is  
 small. We made small progress, being opposed  
 by a head wind. Passed the 'Bayou des buttes' in  
 the forenoon; this Creek derives its name from  
 a vast number of Indian mounts discovered by  
 the hunters along its course: we were detained  
 an hour extraordinary at breakfast, from the  
 necessity of repairing the rudder irons damaged  
 going over a rocky flat. The margin of the river  
 is clothed with such timber as generally grows  
 on inundated lands, particularly a species of the  
 white oak called vulgarly the overcup-oak; its  
 timber is remarkably hard, solid, ponderous and  
 durable, and it produces a large acorn in very  
 great abundance upon which the Bear feeds;  
 it is also very fattening for Hogs.

At noon got a good observation & found the  
 latitude to be 32° 50' 8".5 — after dinner passed  
 a long narrow Island. The face of the Country  
 begins

1804 } begins to change ; the banks are low and steep,  
November } and the river generally deeper and much con-  
tracted, being from 30 to 50 yards wide ; this  
low Country is 2 or 3 leagues wide on each side  
of the river, liable to overflow 12 or 15 feet  
above the level of the land, the soil is a very  
sandy loam in the neighbourhood of the river,  
& covered by such vegetables as are found on the  
inundated lands of the Mississippi ; in short this  
tract presents every appearance of a newly cre-  
ated soil, very different from what we passed  
below : it may be supposed that there existed a  
great Lake within the space now occupied by  
this alluvial tract, which may have been drained  
off by a natural Canal worn out by the abrasion  
of the waters, and that since that period, the  
annual inundations have been replenishing this  
space with the alluvion of its waters ; 18 or 20  
feet of soil perpendicular is yet wanting to ren-  
der it a fit habitation for man ; it appears never  
the less to be well peopled by the beasts of the  
forest, several of which presented themselves to  
view, but they must all retire to the high lands  
during the season of the inundation. We now  
begin to see quantities of water fowl which are  
not generally very numerous untill the cold rains  
and frost drive them to us from the northward.  
Fish is not so abundant in this river as might be  
expected ; at the post we were informed that the  
river had been extremely full of fish untill the  
year

year 1799, when the waters of the inundation of the Mississippi dammed up the Washita river some distance above the Post and produced a stagnation and consequent corruption of the waters, which destroyed all the fish within the influence of this cause. The river continues to be contracted, seldom exceeding 60 yards and generally deep; no current is felt excepting in places a little shallower than the rest. — Thermometer at 8<sup>h</sup> p.m. 44° Extremes 44°—58° Clear.

Thermometer in air 38° in river water 54° — Thursday 15<sup>th</sup>. Clouds — Calm. Continued our voyage thro' a Country of the same appearance as yesterday. Passed some rapids without difficulty — the banks still continue low; from ten to 15 feet above the present level of the river; the water marks on the trees from 15 to 20 feet. Landed to observe about 90 yards higher than the upper point of the Island of Mallet, judging that we were not far from Lat. 33° the division line between the territories of Orleans and Louisiana; we found the Latitude by a very good observation to be 32° 59' 27".5. The Island of Mallet is on the right of the main channel, and the place of observation being 90 yards N 45° E from the upper point of the Island. Making allowance for the breadth of the river (50 yards), Latitude 33° may be found from the above data when the Jurisdiction of the territories may require

1804 } require it, this Island of Mallet being very well  
 November } known to the Hunters. Should time and circum-  
 stances permit on our return, a 2<sup>d</sup> meridian alti-  
 tude of the Sun may be taken and a proper mark  
 set up in Lat: 33°.—In general the bed of the  
 river along this alluvial country is fully covered  
 by water from bank to bank & the navigation  
 good, but to day at 3<sup>h</sup> p.m. we passed 3 contiguous  
 sand-bars or beaches called ‘les trois bat-  
 tures’; & at three & a half hours p.m. the ‘bayou  
 des grand Marais’ (great Marsh Creek) on the  
 right: passed also in the evening on the same  
 side ‘la Cypriere Chatelrau’: a point of high  
 land approaches within half a mile of the river  
 on the right. Thermom<sup>ē</sup> at 8<sup>h</sup> p.m. 50°—Ex-  
 tremes 33°—60°. Made this day 16 miles 42  
 perches. This days voyage was shortened by an  
 indisposition which confined me to the tent un-  
 till the hour of breakfast.

Friday 16<sup>th</sup> Thermom<sup>ē</sup> in air 38° in river water 54°—  
 Cloudy—Calm. Set out at 6<sup>h</sup> 58' and continued  
 our voyage, the wind rises northerly against us,  
 nevertheless we make 7½ perches p: ¼ min:  
 whereas with our former boat we should not  
 have exceeded 4 per: still however our improved  
 progress is short of the velocity which a boat  
 for our purpose ought to attain; it should not  
 fall short of 12 per: p: ¼ min: which would  
 be about 4½ miles p: hour. No observation to  
 day

day the weather being cloudy, damp and disagreeable. Between 11 & 12 o'clock passed on the right the 'marais de la Saline' (Salt-lick marsh) There is here a small marshy lake, but it is not intended by its name to convey any idea of a property of brackishness in the lake or marsh, but merely that it is contiguous to some of the licks, which are sometimes termed 'Saline' & sometimes 'glaise,' being generally found in compact clay which might serve for potter's ware; the bayou de la Tulipe forms a communication between the lake and the river: there is opposite to this place a point of high land forming a promontory and advancing within a mile of the river, to which boats resort when the low grounds are under water: a short league after, we came to the mouth of the grand bayou de la Saline (Salt-lick Creek) on the right; this is a creek of considerable length & tollerably good navigation for small boats, the Hunters ascend it to an extent of a hundred of their leagues in pursuing their game. They all agree that none of the springs which feed this Creek are salt; it has obtained its name from many buffalo salt licks which have been discovered near to the Creek. Altho' most of those licks by digging will furnish water holding in solution more or less marine salt, yet we have reason to believe that many of them would produce Nitre. We now begin to observe a stratum of a dirty

1804 }  
 November } dirty white colored clay under the alluvial soil;  
 this clay is similar to what we observed before  
 we entered the alluvial tract; we have therefore  
 reason to expect, that we are gradually emerg-  
 ing from this sunken tract & shall soon ascend  
 into the high land country. Made this day 17  
 miles 185 perches. In the evening it began to  
 rain. Thermom<sup>at</sup> at 8<sup>h</sup> p.m. 42°. Extremes 38°—  
 51°.

Saturday 17<sup>th</sup> Thermom<sup>at</sup> in air 40° in river water 54° —  
 fog on the river — calm — river risen 2½ inches  
 during the night.

Continued our voyage; the low lands are still  
 alluvial, at least to a certain depth; an under  
 stratum of clay appears in many places, where  
 the banks have been undermined & broken  
 down: we remarked that since we entered the  
 alluvial country about 32° 52' Lat: we have  
 seen no long moss (*Tilandsia*) altho' this low  
 damp country seems in all respects well adapted  
 to favor its production; upon enquiry of our  
 Pilot, he informs us, we shall see no more of  
 it; probably its limit of vegetation northerly  
 may be fixed by nature near to 33° Lat: Saw  
 a great quantity of the long-leaf pine, which is  
 frequently found in rich & even inundated lands  
 as is the case here; the short leaf or pitch pine  
 on the contrary is always found upon arid lands  
 & generally in sandy & lofty situations; but  
 our

our Country furnishes it in a hard meagre clay. { 1804  
In the forenoon saw the first swan which was { November  
shot by one of our hunters ; it was a solitary  
one whose mate had probably been killed : this  
is the season when the poor inhabitants of the  
settlement of the Washita turn out to make their  
annual hunt ; they carry no provision with them  
but a little indian corn, depending on their guns  
and ammunition for the rest. The Deer is now  
fat & their skins in perfection ; the Bear also is  
now in his prime with regard to the quality  
of his fur and the quantity of fat or oil which  
he yields, he has been feeding luxuriously for  
some time upon the autumnal fruits of the  
forest, such as pirsimmons, grapes, pawpaws,  
walnuts, packawns, hickory-nuts, chinquapins,  
beech-mast, a great variety of acorns &c &c ;  
it is however well known (notwithstanding the  
fancies of some writers) that the Bear does not  
confine himself to vegetable food ; the planters  
have ample experience of his carnivorous dis-  
position. He is particularly fond of Hog's flesh,  
but no animal escapes him that he is able to  
conquer : Sheep & Calves are frequently his prey  
and he often destroys the fawn when he stum-  
bles upon it ; he cannot however discover it by  
the sense of smelling notwithstanding the ex-  
cellence of his scent ; Nature has protected the  
helpless young by denying it the property of  
leaving any effluvium upon its tract, which pro-  
perty

1804 }  
 November } perty is so powerful in the old Deer: perhaps it may not be generally known to Naturalists, that between the hoofs of Deer &c is found a sac with its mouth inclining upwards; this sac always contains more or less musk, which by escaping over the opening in proportion as it is secreted, gives to the foot the property of leaving on the ground a scent wherever it passes: during the rutting season the musk is most abundant particularly in old males, which may often be smelt at a considerable distance by the hunters.

The Bear unlike to most other beasts of pray does not kill the animal immediately he has seized upon, but regardless of its strugles, cries and lamentations, fastens upon it and (if the expression may be allowed) devours it alive: the taste of M<sup>r</sup> Bruce & his Abyssinians may have been formed upon this excellent model.— The hunters count much of their profits from the oil drawn from the Bear's fat, which at New-Orleans is always of ready sale, and is much esteemed for its wholesomeness in cooking, being preferred to butter or hog's lard; it is found to keep longer than any other oil of the same nature, without turning rancid: they have a method of boiling it from time to time upon sweet-bay leaves which restores it or facilitates its conservation. At noon found our Latitude to be  $33^{\circ} 13' 16''$ .5. In the afternoon saw a small Alligator, which we did not expect in so northern

ern a situation; passed a few rapids & saw cane  
 brakes on both sides, the canes of a small size, { 1804  
 which demonstrates that the water does not sur-  
 mount the bank above a few feet: the river  
 widens & a number of sand-beaches are seen.  
 Therm: at 8<sup>h</sup> p.m. 44°—Extremes 40°—41°.  
 Made this day 15 miles 308 perches.

Therm: in air 32°—in river water 52°—Sunday 18<sup>th</sup>  
 Serene—Calm—river seems rather on the rise.  
 Set out at 7<sup>h</sup> 20' and continued our voyage; passed  
 along a narrow passage this morning, about 70  
 feet wide; the whole of the water of the river  
 runs thro' this passage; on the left the old chan-  
 nel of the usual breadth leaves an interval which  
 becomes an Island when the water passes along  
 the old bed of the river during freshes: Came  
 up to a place at the hour of breakfast where there  
 is an appearance of some clearing called 'Cache  
 la Tulipe' (Tulip's hiding place) this is the name  
 of a french hunter who concealed his property  
 in this place. It continues to be a practize of  
 both white and red hunters, to deposit their  
 skins &c. often suspended to poles or laid over a  
 pole placed upon two forked posts in sight of  
 the river, untill their return from hunting; these  
 deposits are considered as sacred and few exam-  
 ples exist of their being plundered.

The banks of the river have now the appear-  
 ance of the high land soil, with a stratum of 3  
 or

1804      } or 4 feet of alluvion deposited thereon by the  
 November } river, this superstratum is greyish and very sandy  
 with a small admixture of loam, which indicates  
 the poverty of the mountains and uplands where  
 the sources of the river take their rise. At noon  
 we found our Latitude to be  $33^{\circ} 17' 13''$  — In  
 the afternoon passed on the right, the entrance  
 of a bay, which within must form a great lake  
 during the inundation. We now see a consider-  
 able number of the long-leaf pine tree; the canes  
 along the bank have a better appearance being  
 much larger in size, this indicates a better or  
 more elevated soil: Canes subject to be inun-  
 dated, i. e. the land to be inundated 3, 4 or 5 feet,  
 are always small and tough; they grow much  
 finer where there is little or no inundation, pro-  
 vided the soil be rich & loose. Passed a high  
 hill (300 feet) on the left clothed with lofty  
 pine trees. Thermom: at 8<sup>h</sup> p.m.  $57^{\circ}$  cloudy  
 weather threatens rain. Made this day 18 miles  
 75 perches. Having been much indisposed for  
 some days past, the number of remarks are prob-  
 ably fewer than might have been made—I still  
 remain in the same situation.

Monday 19<sup>th</sup>. Therm: in air  $54^{\circ}$ —in river water  $54^{\circ}$ —  
 Cloudy—Calm—river at a stand. Set out at 6<sup>h</sup>  
 $56'$  and continued our voyage. The banks pre-  
 sent still more the appearance of the high land  
 soil, the under stratum being a pale yellowish  
 clay

clay and the alluvial soil of a dirty white sur- { 1804  
mounted by a thin covering of a brownish veg- { November  
etable earth: the trees begin to have a better  
appearance, growing to a considerable size and  
height, tho' much inferior to those of the allu-  
vial banks of the Mississippi: passed the 'bayou  
de hachis' on the left this morning; points of  
high land not subject to be overflowed frequently  
touch the river, the valley is said to be league or  
more in breadth on each side of the river: passed  
some pine hills on the left called 'Cote de Cham-  
pignole', the river has been narrow during the  
course of this day's voyage, not exceeding on the  
average from 50 to 60 yards. Thermometer at  
8<sup>h</sup> p.m. 62° Extremes 54°-67° Made this day  
18 miles 120 perches.

Therm: in air 59° in river water 54° — Cloudy Tuesday 20<sup>th</sup>  
— Calm. No change in the river. Set off at 6<sup>h</sup>  
48' — The banks of the river appear to be higher  
and the river wider, we meet with a number of  
sand beaches and some rapids but good deep  
water between them. At 7½<sup>h</sup> a.m. passed a  
creek which forms a deep ravine in the high  
lands and has been called 'Chemin Couvert' —  
a little past 8<sup>h</sup> we ascended a rapid where the  
water was confined to a breadth of 40 yards, a  
little farther we had to quit the great channel on  
account of its shallowness and rapidity, & passed  
along a narrow channel 60 feet wide: without a  
guide

1804      }      November }      guide a Stranger would have taken this passage  
 for a Creek. Between 11 and 12<sup>h</sup> saw an alligator,  
 which surprised us much at this late season &  
 so far north. The Banks (exclusive of the large  
 timber) are covered by cane or thick under-  
 brush, frequently so interwoven with thorns and  
 briars, as to be impenetrable, untill the way is cut  
 with an edge tool: we see also some species  
 of timber not common below, such as Birch,  
 Maple, holly & two kinds of timber to which no  
 other name has yet been given but 'Bois du bord  
 de l'eau' (water side wood). Pirsimmons and  
 small black grapes are plenty in some situations;  
 the first are often very large and excellent, the  
 last a mixture of sweet and tart; those are also  
 common on the Mississippi. The weather being  
 cloudy we did not land to observe. In the after-  
 noon observed some feruginous earth on the  
 right: the margin is frequently fringed with a  
 variety of plants & vines, of the latter several  
 species of the convolvulus, which no doubt in  
 their season ornament this river with their ele-  
 gant flowers. Thermom<sup>r</sup> at 8<sup>h</sup> p.m. 54°. Ex-  
 tremes 54°-62°. Made this day 18 miles 308  
 perches.

Wednesday 21<sup>st</sup>.      Therm<sup>r</sup> in air 43° in river water 54° — a lit-  
 tle fog — calm. Set out & passed a hill and cliff  
 100 feet perpendicular crowned with lofty pines  
 called 'Cote de Finn' (Finn's hill) a chain of  
 high

high land continues some distance on the left ; the cliff presents the appearance of an ash colored clay ; passed a strong rapid, and a little farther a Creek on the right called Bayou d'Acassia (Locust Creek) : The river varies here from 80 to 100 yards wide ; we frequently see indications of iron along the banks and some thin strata of ore from  $\frac{1}{2}$  inch to 3 inches thick, but no other metallic appearance, nor indeed any thing uncommon in the fossil kingdom ; a little cloudy this morning, but cleared up before noon & got ashore hastily at a steep inconvenient place among trees and brush, and had a tollerably good observation notwithstanding : Latitude found  $33^{\circ} 29' 29''$ . The day proves mild, warm and agreeable, which acted as a restorative to myself and others who had been indisposed for some days past : Therm: at 3<sup>h</sup> p.m.  $72^{\circ}$  Altho' Ducks, Geese and Turkeys are often seen, yet we cannot say they are in that abundance which from report we expected, and they are so shy, that we seldom can get a shot from our large boat ; but by sending the canoe a head some game is procured ; it is probable that higher up, we shall be more successful. Therm: at 8<sup>h</sup> p.m.  $58^{\circ}$  — Extremes  $43^{\circ}$ — $72^{\circ}$  Made this day 18 miles 36 perches.

Therm: in air  $40^{\circ}$  in river water  $53^{\circ}$  — Light Thursday 22<sup>d</sup> clouds — calm. — No change this morning in the

1804 } the general appearance of the country, the tim-  
 November } ber such as has been mentioned, with an in-  
 creasing proportion of holly, birch, maple and  
 beautiful pine-trees ; at  $10\frac{1}{2}$  a.m. came to the  
 road of the Cadadoquis Indian Nation leading  
 to the Arcansa Nation ; a little beyond this is  
 the Ecor à Fabri (Fabri's Cliffs) 80 to 100 feet  
 high : it is reported that a line of demarkation  
 run between the french and spanish provinces,  
 when the former possessed Louisiana, crossed  
 the river at this place ; and it is said that Fabri  
 a french-man & perhaps the supposed Engineer  
 deposited lead near the cliff in the direction of  
 the line : we could not however obtain any au-  
 thenticated account of this matter, and it is not  
 generally believed : a little farther is a smaller  
 cliff called 'le petite cor à Fabri' (the little cliff  
 of Fabri) ; those cliffs appear to be composed  
 chiefly of ash-colored sand with a stratum of  
 clay at the base, such as reigns all along under  
 the banks of this river. The day being hazy and  
 cloudy we made no observation for the Latitude  
 at noon. In the afternoon we encountered a  
 great many difficult rapids, the current of the  
 river being frequently confined to a very small  
 space, where the depth of water is but barely  
 sufficient for the passage of the boat ; the addi-  
 tional rapidity of the current indicates that we  
 are ascending into a higher country. The water  
 of the river now becomes extremely clear and  
 is

is equal to any in its very agreeable taste as a { 1804  
 drinking water. The general breadth of the { November  
 river to day has been about 80 yards, altho' in  
 certain places not above one half of this quan-  
 tity. We now find immense beaches of gravel  
 and sand, over which the river passes, in the sea-  
 son of its floods with the rapidity of a torrent,  
 carrying with it vast quantities of drift wood  
 which are in many places piled up in prodigious  
 masses, lying 20 feet above the present level of  
 the water, and points out to us already the danger  
 of ascending or descending this river in certain  
 degrees of its floods: accidents nevertheless are  
 rare with the canoes of the Country; ours is the  
 first barge of so large a size that ever ascended  
 this river: passed a very intricate rapid in the  
 evening, which we could not get up untill we  
 had carried a rope ashore. Encamped upon an  
 elevated gravel beach: Therm: at 8<sup>h</sup> p.m. 54°  
 Extremes 40°-68° Made this day 14 miles 317  
 perches.\*

This day an unlucky accident happened, which  
 was very nigh being extremely serious. Doctor  
 Hunter was employed in the cabin of the boat  
 loading one of his pistols; he held it between  
 his legs upon a bench with his head almost

\* It must be expected that imperfections in our reckoning  
 must arise from the retardments and difficulties met with on  
 the rapids and shoals; compensations for lost time and rate  
 of going are made at the moment when the best judgement  
 can be formed.

over

1804 } over the muzzle: while in the act of ramming  
 November } down the ball, the pommel slipt from the bench  
 & the cock of the lock came with force against  
 it, which giving way discharged the pistol, the  
 rammer and ball passed thro' the fingers & thumb  
 of the right hand & also thro' the brim of the  
 hat within little more than an inch of the Doc-  
 tor's forehead; his thumb & fingers were much  
 torn, but no bone was broken, the concussion of  
 the head was most severely felt: the bottom of a  
 new powder horn (not well secured) which lay  
 upon the table was forced outwards & the pow-  
 der partly spilt upon the table, which providen-  
 tially did not take fire altho' the wadding was  
 found smoking upon the table: the circum-  
 stance of the bottom of the powder-horn being  
 forced outwards, points out a curious effect of  
 the elastic power of the air, viz after sustaining  
 a considerable compression the returning vibra-  
 tion causes a partial rarefaction, & at the same  
 instant the common air confined within bodies  
 involved by the sphere of rarefaction, exerting  
 its spring to restore the equilibrium, forces out-  
 wards all obstacles not sufficiently secured to  
 resist its action. The Doctor's wounds were  
 dressed; he suffered great pain and debility, but  
 after some repose felt better in the evening.

Friday 23<sup>d</sup>: Therm: in air 48° in river water 54°—light  
 clouds—calm. River upon the fall. Set off and  
 continued

continued our navigation thro' difficult passages; { 1804  
the river is broken into a number of small streams { November  
by Islands, short turning rapids, sunken logs,  
shoals, bars, and every impediment to be expected  
in our situation, and this continued at short in-  
tervals during the whole of the day, so that our  
courses and distances cannot be expected to be  
perfect; every allowance which could be judged  
necessary at the moment was made: I fortunately  
obtained a good observation of the Sun's mer-  
altitude in the interval of some shifting clouds:  
Latitude deduced  $33^{\circ} 41' 35''$ . The banks of  
the river as we ascend are less elevated, being  
now only from 9 to 12 feet, and probably the  
freshes surmount them some feet; we passed  
a great number of high & low gravel and sand-  
beaches; on those were to be seen fragments of  
stone of all forms & of a great variety of col-  
ors; some highly polished and rounded by fric-  
tion, and may have belonged to the mountains,  
rivers and oceans of a World, from the ruins of  
which the Globe we inhabit may have been  
formed. The banks of the river in this upper  
Country suffer greatly from abrasion, one side  
and sometimes both being broken down by every  
flood. We saw nothing to day worth noticing,  
no change being observable in the appearance of  
the lands and timber along the hills and banks  
of the river: we found on a gravel beach some  
fragments of the same kind of matter we found  
lower

1804 } November } lower down resembling pit-coal; it burns without blaze to a white ash, but will not consume (in common temperature) without other fuel: under the burning glass, it emits smoke & consumes, yielding a faint smell of sealing wax; it is light and friable, & affords very little evidence of being penetrated by bituminous matter. Therm: at 8<sup>h</sup> p.m. 54° Extremes 48°-72° Made 13 miles 28 perches.

Saturday 24<sup>th</sup> Therm: in air 48° in river water 54°—light clouds—calm—river at a stand. Set off & continued our voyage thro' a country in all respects similar to that thro' which we passed yesterday, excepting that our obstacles from strong rapids are considerably augmented: at a place on the left called 'Auges d'Arclon' (Arclon's troughs) we observed some laminated iron ore, and a stratum of tenacious black sand shining with minute chrystals. The general breadth of the river is now 80 yards, tho' in many places greatly enlarged by Islands & shallows, and at other places contracted to 80 or 100 feet. The river is now in many places rocky of a greyish color & rather friable. Observed some willow very different from what is found below and on the banks of the Mississippi, the last is very brittle, this on the contrary is extremely pliant & resembles the osier, of which it is probably a species, I propose on our return to take some plants along with us; its

its foliage is now of a golden yellow & falling : { 1804  
we also found some of the larger Whortle-berry { November  
in fruit, the berry is of a Sub-acid agreeable taste,  
the leaves not yet fallen of a beautiful crimson.

The weather being cloudy we had no observation at noon & went on to dine at the forks of the Washita and Missouri the lesser ; the latter comes in from the left hand and is a considerable branch, perhaps about  $\frac{1}{4}$  of the Washita : Hunters often ascend the little missouri, but they are not inclined to penetrate far up, because this branch reaches near to the great planes or prairies upon the red river, which are often visited by the lesser Osage Tribe settled on the river Arcansa : These last frequently carry war into the Cadadoquis tribe who are settled on the red river about W.S.W. from this place, and indeed they are reported not to spare any nation or people. They do not come upon the head waters of the Washita, because they are surrounded by a number of mountains or steep hills rising behind each other, and so extremely difficult to travel over, that those savages perceiving no desireable object, do not attempt to penetrate to the river, & it is supposed to be unknown to the nation : The Cadadoquis (or Cadaux as the french who are fond of abbreviations generally pronounce the word) may be considered as Spanish Indians ; They boast, I am told with truth, that they never have imbrued their hands in the blood of a white Man:

1804 } Man : it is reported (perhaps falsely) that they  
 November } are excited to enmity by the Spanish officers at  
 Nacocdoches against the Americans.

We are told there is a mine up the little Missouri, it is said that the stream runs over a bright splendid bed of mineral of a yellowish and whitish color, it is most probably martial pyrites: some 30 years ago, several of the inhabitants hunters worked upon this mine and sent a quantity of the ore to the Government at New Orleans, but they were prohibited from working any more. Therm<sup>°</sup> at 3<sup>h</sup> p.m. 59° Extremes 48°-72° Made this day by a very uncertain reckoning 11 miles 152 Perches.

Sunday 25<sup>th</sup> This morning proved very rainy, having commenced raining before day, we were therefore constrained to continue encamped: a cessation took place after breakfast, which gave us some hopes of being able to proceed, but this was not of long duration; the rain recommenced and we remained all day in our tents. We have the consolation however to expect that the river will rise a little in consequence of the rain, which will facilitate our ascent over the shoals that are to be expected above. Therm<sup>°</sup> at 8<sup>h</sup> p.m. 62° Extremes 54°-70°

Monday 26<sup>th</sup> Therm<sup>°</sup> 50°— river water 57°— clear above. Calm— river risen 3½ inches in the night. Contrary

trary to expectation the morning proved not only fine and serene, but of a mild, agreeable temperature. In general after the winter season sets in, the changes in the weather are made by extremes. A day or two of rain is commonly succeeded by a cold and blowing north wester, and the day following a frost of some severity, which has not been the course upon this last occasion, it appears also that the rain has raised the temperature of the river 3°. The water is now remarkably clear and fine, and it does not seem to have been discoloured by the last rain. There is still a great sameness in the appearance of the river banks, the Islands are skirted with osier, and immediately within on the bank grows a range of birch trees & some willows; the more elevated banks of the River are clothed by a thick growth of Cane & the timber which rises above the Cane is such as has been already mentioned Viz. oak, white, black, and red; many species of each: black Maple, white maple, Sycamore, Elm several species, Ash, hickory many species. Dog wood, Holly, Iron wood &c—

Saw a number of yellow butterflies fluttering about the banks of the River. We continue to encounter the same obstacles from the shoals & rapids; the valley of the river, in its present low state is filled with Islands, which dividing the current reduces the depth of the Channel; We find no great difficulty where the water is collected

1804 } lected into a single channel. Our Pilot informs  
 November } us that there is a body of excellent land upon the  
 little Missouri & more especially on the Creek  
 called the 'Bayou à terre noire,' which falls into  
 the little Missouri; this land reaches within a  
 few miles of the Washita, and is said to extend  
 to the Red River being connected with the great  
 prairies above the Cadaux nation & in the prox-  
 imity of the red River: this rich tract of Coun-  
 try is said to be of very considerable extent per-  
 haps a square of 30 miles & is connected with  
 the great prairies which are the hunting grounds  
 of the Cadaux Nation, consisting of about 200  
 warriors, they are warlike, but frequently unable  
 to defend themselves against the tribe of Osages  
 who are settled upon the Arcansa river, who pass-  
 ing round the mountains which give birth to the  
 Washita, along the prairies which enclose those  
 mountains on the West and seperate them from  
 the main Chain of mountains which furnish the  
 waters of the red & arcansa river, pass down in  
 the Cadaux Country & rob & plunder them of  
 their horses and other effects, & not unfrequently  
 take a few scalps; for it seems that this detached  
 tribe of the Osages is a lawless gang of robbers,  
 making war with the whole world.

Therm<sup>o</sup> at 8<sup>h</sup> p.m. 62°—Extremes 50°—68°  
 Made 12 miles 21 Perches.

Tuesday 27<sup>th</sup> Therm<sup>o</sup> 54°—river water 58°—Cloudy—  
 River

River risen above the mark which was 12 inches out of water: set off at 7<sup>h</sup> 1'. and continued our Voyage with the same obstacles from rapids, which were very violent at particular points from the increased body of water descending from the higher position; but we obtained at the same time the advantage of approaching the willows & even passing thro' them, to avoid the most difficult passes. During the hour of breakfast the river rose 1½ inches perpendicular. The general height of the main banks is now from 6 to 12 feet above the level of the water, and the land is rather of a better quality, the Canes &c shewing a more luxuriant vegetation: the superficial soil subject to inundation is of brownish appearance greatly mixed with Sand; At noon arrived at 'cache à Maçon' (Masons hiding place) on the right, stopped here for dinner. Having been informed of some pit coal reported to be in the neighbourhood, we determined to explore its position. Doctor Hunter with the Pilot set out for this purpose, & at about 1½ mile N.W. of the Boat found in the bed of a Creek a substance similar to what we had formerly seen under the name of coal; some pieces of it were very black, solid, & of a homogenous appearance greatly resembling pit Coal, but it was deficient in ponderosity, & did not seem to be penetrated by bituminous matter in a sufficient degree to constitute Coal; We may perhaps therefore be permitted

1804 } mitted to consider it as vegetable matter in a  
 November } certain stage of its progress of transmutation into  
 Coal, we were the more confirmed in this opinion  
 by discovering other fragments, which still re-  
 tained very evidently the fibrous texture of wood,  
 one peice in particular seemed to have been a  
 large chip taken out by the felling ax. Those  
 last pieces were not so far advanced in the trans-  
 muting progress as the first mentioned; although  
 black it was not so perfect, being rather a very  
 dark brown black, retaining the exact form &  
 shape of the wood as it had been separated from  
 the log: as this incipient or imperfect Coal was  
 found imbedded among clay & gravel, which  
 appeared to have been washed down by the tor-  
 rent, no clue could be found to lead to a discov-  
 ery of the process by which nature effects so  
 extraordinary a change, an ingenious enquirer  
 placed in favorable circumstances, will probably  
 have the good fortune to make this discovery:  
 The time may arrive when the Planter who  
 shall be clearing his Plantation or farm of use-  
 less timber, will be enabled from the instructions  
 of the Chemist to place the whole in a situation  
 to be transmuted into an usefull article capable  
 of long preservation. This is no doubt the Car-  
 bonated wood described by Kirwan & other  
 Chemists. We found along the banks a species  
 of the white thorn loaded with abundance of  
 ripe fruit, being a small oval berry of a cornelian  
 colour

colour & agreeable sweetish taste ; the whortle { 1804  
November berry was also found in the same situation. The white maple has now a beautiful appearance, its leaves before their fall first assume a pale yellow, but this soon fades, and they change into a splendid white and present at some distance the appearance of clusters of elegant flowers. Being cloudy at noon we made no observation for the Latitude.

We suppose the river to have risen at least 30 inches and it now flows with great rapidity, which obliges us to pass sometimes among the willows to avoid its impetuosity : this afternoon we passed some reaches of the river, which were very handsome, being of considerable length, and at least 150 yards wide, and flowing with a full current from bank to bank. We found a considerable number of unknown (to us) plants some of them very handsome, but our very limited knowledge in practical botany, did not enable us to discover what they were, particularly as they were not in flower. Made this day 13 miles 39 perches. Therm: at 8<sup>h</sup> p.m. 66° Extremes 54°-71°

Therm: 68°—river water 60° fallen 4 inches Wednesday 28<sup>th</sup> in the night — Cloudy — calm. Set off at 7<sup>h</sup> 5' and continued our voyage, meeting the same species of obstacles as yesterday—the river appears to increase in width being sometimes 170 yards

1804 } yards broad, flowing at this time with a full tide  
November } from shore to shore. The Current is in some places  
extremely rapid, that is where the depth of the  
Channel is diminished and the bed contracted,  
in such situations we are under the necessity of  
catching hold of the willows &c, & hauling up  
along shore, oars and poles being insufficient to  
stem the violence of the torrent; in other situations  
for miles together the current is in-  
considerable, in fact it is nothing under the shelter  
of the points, this advantage is the result of the  
enlargement and encreased depth of the river.  
Being cloudy we had no observation for the Lat-  
itude. Some of our people who walked out with  
their guns at the hour of dinner discovered some  
buffalo tracts we are therfore in hopes soon of  
getting some fresh beef. We past some beautifull  
Pine Forests. The Lands in many places appeared  
of a pretty good quality producing trees and a  
variety of vegetable subjects indicating a good  
soil. Encamped in the evening after making by  
our reckoning 12 miles 255 perches. Here we  
found an old dutch Hunter with his party con-  
sisting in all of 5 persons. This man has resided  
40 years on the Washita and before that period  
has been up the arcansa river, the white river and  
the river St: Francis; the two last he informed  
us are small rivers of difficult navigation similar  
to that we are now upon, but the Arcansa river  
is a river of great magnitude, a large and broad  
channel,

channel, and when the river is low with long and great sand beaches like to the mississippi. So far as he has been up, the navigation is safe and commodious, without any impediment from rapids or shoals, upon all those rivers, the soil is of the first rate quality, the countries are of easy access, being lofty open forests, unembarrassed by canes & other under growth: the lands on the Arcansa are generally level and not subject to inundation, with here and there gently rising hills. The river is not embarrassed with rocks so far as this informant has ascended, but its bed is composed of mud and sand: the water of the river is extremely bad to drink, being of a disagreeable red colour and very brackish when low, a multitude of creeks which flow into the river furnish sweet water, which the voyager is obliged to carry in vessels on board to supply his immediate wants, hence this inconvenience is not of much moment. This man confirms the frequent reports given of silver being abundant up this river; he has not been so high as to see it himself, but says he has received a silver pin from a hunter who assured him that he himself collected the virgin silver from the rock, out of which he made the Epinglete by hammering it out; The tribe of Ozages live higher up than this position, but the hunters rarely go so high, being affraid of those savages who are at war with the world and destroy all strangers they can meet

1804 }  
 November } meet with. It is reported that the arcansa nation  
 with a part of the Chactaws, Chicasaws, Shaw-  
 nese &c. have formed a league and are actually  
 gone or going 800 strong against those depre-  
 dators, with a view to destroy or drive them en-  
 tirely off and possess themselves of their fine prai-  
 ries which are most abundant hunting grounds,  
 being plentifully stocked in Buffalo, Elk, Deer,  
 Bear and every other beast of the chase, common  
 to those Latitudes in America. Our old Dutch  
 Hunter informs us of a saline or salt spring from  
 which he has frequently supplied himself with  
 salt by evaporation, we shall visit it in the morn-  
 ing, being only half a league distant. Made 12  
 miles 255 perches. Therm: at 8. p.m. 73° Ex-  
 tremes 68°-78°

Thursday 29 Therm: 72° river water 62°—Cloudy—wind  
 South, blew strong all night—This morning  
 Doctor Hunter went with a party and the old  
 dutch hunter to visit the saline, which was found  
 in the bottom of the bed of a dry gully near a  
 Creek ; after digging a few feet found the water  
 which proved very brackish to the taste ; the  
 saline lies about  $1\frac{1}{2}$  mile northerly from our  
 encampment, a creek falls into the river a little  
 above our encampment, being the same which  
 communicates with the saline, a quantity of the  
 water was brought into camp whose specific grav-  
 ity was carefully ascertained by comparison with  
 the

the river water and found to be as 1.02116+ to 1. Evaporated 10 quarts of the water which produced a saline mass weighing when dry 8 ounces. It began to rain about 9<sup>h</sup> a.m. which obliged us to remain in camp untill after dinner, when it cleared up, and we set out at 1<sup>h</sup> 27' p.m., the water of the river has now become whitish and less transparent in consequence of the rain and appears to be rising again altho' it seemed to have stopped since last night: the water was tolerably favorable in the afternoon having met with only one rapid of difficulty and considerable length: since we have had so much difficulty to encounter from the shoals and violence of the current, the Soldiers have exerted themselves with a considerable degree of vigor and perseverance and seem desireous that we should accomplish the end of our voyage. Therm: at 8<sup>h</sup> p.m. 52° Extremes 52°-76° Made this day 8 miles 2 perches. The weather clears up and begins to grow cold, we expect a north-wester in the morning.

Therm: in air 38° in river water 60°— river Friday 30<sup>th</sup> risen 19 inches— clear calm. Set off & continued our voyage against a strong current during the greatest part of the day, altho' frequently we found favorable eddies or little or no Current where the bed of the river became enlarged, which sometimes extended to 150 and even 170 yards

1804 } yards in breadth. Saw great flocks of Turkeys  
 November } to day, two of which were killed. At  $10\frac{1}{2}$ <sup>h</sup> a.m. arrived at the large branch on the left called 'Fourche des Cadaux' (Cadadoquis fork) about 100 yards wide at its entrance into the Washita; immediately beyond which on the same side the land is considerable elevated (ab<sup>t</sup> 300 feet.) The wind from North and N.W. opposed us most of the day, so that our progress was not very rapid. At noon landed & observed the Sun's altitude in a difficult place, in some measure thro' the branches of trees, the Latitude deduced was  $34^{\circ} 11' 37''$ . As we advance to the north we perceive more of the effects of winter; the trees are now nearly stripped of their foliage, which a week below seemed to be nearly entire, altho' changed in color: Being informed of a saline or salt-lick, we landed before 3<sup>h</sup> p.m. and the Doctor with a party went to view it, therm<sup>r</sup> at 3<sup>h</sup> 57<sup>m</sup>. The Doctor returned in the evening with a quantity of water from the saline, which from taste appeared to be less impregnated than the former, and on trial its specific gravity was found to be when compared with the river water, 1.017647. This salt pit was found in a low flat place subject to be overflowed from the river, it was wet and muddy, the earth on the surface yellowish, but on digging into the stratum which yielded the salt water, it was found to be a bluish clay; probably

ably the water was fresher in consequence of the rain of the day before, which had not fallen when the first water was collected. Ten quarts of this last water produced by evaporation six ounces of a saline mass, which from taste was principally marine salt, it was however evident that it contained besides marine salt, some soda and a bitter salt, which last no doubt was muriated magnesia, but the marine salt greatly predominated. Made 7 miles 28 perches.

Therm' in air 32° in river water 54° Clear— { Saturday  
calm—river fallen 18 inches. The morning was December 1<sup>st</sup>  
cold & damp; we passed a considerable Island  
on the right about  $\frac{3}{4}$  of a mile in length, called  
'Isle du bayou des roches' (rocky creek Island)  
— we were greatly impeded this day by rapids,  
it was with much difficulty, some hazard, & great  
exertion of the men, that we ascended some of  
the rapids: we passed several points of high land  
full of rocks and stones, much harder and more  
solid than we have yet seen; the rocks were all  
silicious, and we began to observe, that their fis-  
sures were penetrated by sparry matter: indica-  
tions of iron were frequent, & even fragments  
of poor ore, but no rich ores of that or any other  
mettal have presented themselves to view. Some  
of the hills appear to be well adapted to the cul-  
tivation of the vine, the soil being a sandy loam  
with a considerable proportion of gravel & stone  
and

1804      } and a superficial covering of good vegetable black  
 December } earth: the natural productions were sufficiently  
 luxuriant, consisting of several varieties of oak,  
 Pine, Dogwood, Holly &c with a scattering un-  
 derwood of Whortleberry, Hawthorn, China-  
 briar and a variety of small vines. It is probable  
 that a skilful Vigneron, who shall undertake the  
 establishment of a Vineyard in a well-chosen po-  
 sition in this neighbourhood, will find his labors  
 amply compensated; the market of New Orleans  
 is at hand, where his wines (if good) may be  
 immediately sold and paid for at a high price.  
 At noon we were detained upon a very bad rapid  
 & shoal, by which we lost the opportunity of  
 making a meridian observation: In the evening  
 also we landed a little earlier than usual at the  
 foot of a long and difficult rapid, which we did  
 not think it prudent to encounter so late, from  
 the danger of getting fast upon it all night: we  
 are now encamped upon the declivity of one of  
 those hills about 150 feet high, commanding a  
 fine prospect both up and down the river, & will  
 at a future day become a rich Vineyard. Therm:  
 at 8<sup>h</sup> p.m. 35°. Extremes 32°—58°. Made this day  
 7 miles 148 perches.

Sunday 2<sup>d</sup>      Therm: in air 30° in river water 50°. Clear—  
 calm—river fallen 4 inches. Continued our voy-  
 age and passed over a series of strong rapids, which  
 opposed us untill the hour of breakfast. The  
 Country

Country appears now to wear a new aspect ; high lands and rocks frequently approach the river ; the rocks are extremely hard, and altho' the grain resembles that of free-stone, yet the stone is hard enough to be used for the purpose of hand-mill stones, to which object it has been applied ; the river beaches also exhibit a great variety of fragments of flint and other stone of the most solid kinds ; the quality of the land seems to improve, the superficial stratum of Vegetable earth being of considerable thickness (from 6 to 12 inches) and of a dark brown color mixed with loam and some sand ; at  $2\frac{1}{2}$ <sup>h</sup> p.m. passed a rock on the margin of the river consisting of blue slate, which we shall probably find time to examine on our way down ; more of the same is to be seen higher up. About a league from the river a little above the slate quarry is a considerable plane called 'prairie de Champaignole,' often frequented by Buffalo ; some salt licks are to be found near it, and in many situations on both sides of this river at small distances from it, we are informed that Salines or salt-licks exist which may be rendered very productive ; when this river comes to be settled, so necessary an article as marine salt will therefore be in sufficient abundance for the consumption of a full population. We are greatly impeded today by rapids and were unable to get ourselves landed in a situation favorable enough to make an observation

1804 } servation for the Latitude before it was too late.  
 December } We encamped just below some rapids which we  
 are to encounter in the morning, upon excel-  
 lent level and rich land, being almost entirely an  
 Oak forest; it is not improbable that this land is  
 sometimes subject to inundation, having the ap-  
 pearance of alluvial Land which has acquired  
 permanency & stability, it is now at least 20 feet  
 above the level of the river water. Therm<sup>r</sup> at  
 8<sup>h</sup> p.m. 38° Extremes 30°-59°

Monday 3<sup>d</sup>: Therm<sup>r</sup> in air 38°—in river water 48°—clear  
 — calm — river fallen 8 inches. Continued our  
 voyage with favorable water until breakfast, after  
 which we encountered a great many very bad  
 rapids during the remainder of the day; some  
 were so difficult, that it was impossible to ascend  
 without sending the greatest part of our people  
 ashore with a good rope, & sometimes they were  
 obliged to walk in the water; the exertions of  
 the Soldiers on some very difficult and trying  
 occasions were equal to every thing which could  
 be expected, and exceeded greatly my expecta-  
 tions: at noon we had a good observation about  
 4 miles below the 'Chutes' (falls) Latitude de-  
 duced 34° 21' 25".5 we were now anxious to see  
 the famous Chutes, which it was supposed at the  
 Post, we should never be able to pass with so  
 large a boat. The land on either hand continues  
 to improve in quality; there appears to be in  
 general

general a superficial stratum of good earth of a dark brown color, upon which vegetation is sufficiently luxuriant; hills frequently arose out of the level country, full of rocks & stones, generally of an extremely hard flinty kind, often resembling the Turkey oil stone, of this kind was a promontory which came in from the right hand, a little before we arrived at the Chutes: this promontory presented some appearance at a distance, of the ancient ruined fortifications & Castles so frequent in Europe, the effect was greatly heightened by a flock of swans which had taken their stations under the Walls which rose out of the Water; as we approached the Birds floated about magestically upon the glassy surface, and in tremulous melancholy accents seemed to consult each other upon measures of safety, the ensemble produced a truly sublime picture: several masses of the same hard rock insulated by the river conveyed the idea of redoubts and out-works; we expect to visit this place in our descent. A little after 4<sup>h</sup> p.m. we arrived at the Chutes. We found these falls to be occasioned by a chain of rocks of the same hard nature with those we had just seen below, here they extended quite across the river, the water making its way over the chain thro' a number of breaches, which by the impetuosity of the torrent had been worn out of the rock: this chain seemed to proceed from a lofty rocky hill

1804      } hill on the left side the appearance of which con-  
December } veyed the idea, of its having been cut down by  
the abrasion of the waters to its present level: the  
various breaches thro' which the water poured,  
were so many cascades, thro' one of which it  
was necessary to pass; otherwise the Barge must  
remain below the Chutes: it was quite uncer-  
tain which of the Cataracts ought to be pre-  
ferred; it was also doubtful whether our barge  
(9 feet wide) could find sufficient breadth &  
depth of water clear of pointed rocks to pass over  
the Chutes. We came up to the rocks & stoped  
between two of the Cascades, & sent a couple  
of Men with a small Canoe, who crept along  
shore & got above the Falls, they made fast a rope  
to a tree, and letting themselves gradually down  
by the same rope, came on board in great safety;  
having now got a number of hands ready to haul  
in upon the rope, we employed the remainder  
with poles to give a proper position to the Barge  
& to guide her into the best passage; we accord-  
ingly entered one of the Cascades, but after many  
fruitless attempts we found there was a deffi-  
ciency of water; with some pointed rocks which  
opposed our passage; we therefore dropped down  
a little way, and moved laterally by poling to a  
second Cataract much more considerable than  
the one we had just attempted: the rolling im-  
petuosity of the water is not easy to describe,  
above and below the fall there was a rapid descent,  
but

but just at the fall there seemed to be a step of { 1804  
nearly one foot perpendicular ; difficult & dan- December  
gerous as this place appeared for a frail bark like  
ours, we were determined to make the attempt  
& we lost no time in entering the strait, in which  
our Barge soon stuck fast at the bows, we then  
concluded it would be impossible to pass ; it  
seemed that an inch or two were just wanting  
to our success ; we however continued our efforts  
by moving from side to side by the stern, while  
great efforts were making upon the rope ; we  
perceived a small advancement by every new  
exertion, our hopes revived, the Barge was in  
this manner forced half way thro' the Cascade,  
& now she seemed so completely wedged into  
the narrow passage, that every effort to stir her  
in any direction proved ineffectual ; the water  
tho' extremely rapid was not deep & we got four  
of our boldest men into the water at her bows,  
as far as possible from the suction of the fall, who  
by feeling for rocks on which she rested, & rais-  
ing her sides with all their might, enabled us to  
advance a step or two farther, beyond which it  
seemed impossible to move : it was now night,  
the stars were visible, the water was cold, and  
altho' the weather was not freezing, it was far  
from being mild, the therm: being at  $45^{\circ}$  ; we  
now repented that we had made the attempt to  
pass so late in the evening, & wished we had  
delayed until the morning ; at the same time the  
river

1804 } river was falling, & it seemed not proper to defer  
 December } the attempt, lest we should not get above the  
 Chutes until another swell of the river: in this  
 situation we determined to lighten the Barge, by  
 sending all the men, except four, ashore to haul  
 upon the rope, while the 4 who remained were  
 with hand levers to endeavour to raise up &  
 lighten the bows of the vessel: the first man who  
 went out discovered, that by the violence of our  
 exertions the rope was beginning to give way &  
 that one of the three strands of which the rope  
 was composed, had actually parted; we were now  
 in a perilous situation, for if the rope had sepa-  
 rated, no force on board could have prevented  
 our being dashed to pieces upon the rocks: we  
 immediately ordered every man on board to his  
 pole to support the boat; in the mean time a man  
 was dispatched thro' the water with the end of  
 a rope from on board, which being made fast. to  
 the same tree, we were again placed in a state of  
 security; we now sent the other men on shore  
 as had been intended, who gaining a firm footing  
 and exerting themselves with great vigor soon  
 extricated us and drew us safely ashore, greatly  
 rejoicing to find ourselves without accident above  
 the 'Chutes': we are encamped under the inces-  
 sант roar of the cataracts, which resembles no-  
 thing so much that I have heretofore witnessed,  
 as the horrid din of a hurricane at New Orleans  
 in the year 1779: the course of the chain of  
 rocks

rocks across the river is nearly S.W. and N.E. { 1804  
 —Made this day 7 miles 218 perches—Therm: { December  
 at 8<sup>h</sup> p.m. 44°—Extremes 38°—59°

Thermom: in air 36° in river water 48°—Tuesday 4<sup>th</sup>  
 clear—calm—river fallen 2 inches. Immediately above the Chutes, the water possesses little or no Current, owing no doubt to its depth & breadth & we went on without opposition untill after breakfast; about 8<sup>h</sup> a.m. passed a ledge of very hard freestone rocks with moderate current: this reach is spacious being not less than 200 yards wide & is terminated by a high rocky hill (about 350 feet perpendicular) crowned with beautiful pine woods, a fine situation for building: at 10½<sup>h</sup> passed a bald hill on the left being chiefly uncovered rock, and arrived at the foot of a most tremenduous rapid full of breakers, the passage being studded with pointed rocks of all magnitudes, which raising their rough heads above water, seemed to threaten with destruction the unwary voyager who should presume to attempt their passage; this place appeared to me much more difficult and dangerous than the Chutes, the water descended along a plane of considerable inclination with a most impetuous velocity, the spray & white foam dashing over the rocks, occasioned a very perceptible mist or vapor which spread about at a small elevation, it is probable it might ascend into the atmosphere

1804 } phere at a higher temperature. We stopped to  
December } contemplate this embarrassment & ordered out  
a rope, which was carried along shore by a cer-  
tain part of the people, the rest using their poles  
on board ; we made many fruitless essays to pass  
upwards by several openings near the shore ; at  
length we attempted the center of the Cataract  
where the current was the most violent, but the  
water deeper, & by very great exertions we got  
over into moderate water, having consumed  $1\frac{1}{4}$   
hour in making about  $\frac{1}{2}$  mile; 300 yards of  
this distance is difficult & perilous, the greatest  
prudence with unceasing exertion being indis-  
pensably necessary to the safety of such a barge  
as ours. We landed above this rapid & by a  
good observation found the latitude to be  $34^{\circ}$   
 $25' 48''$ ; on our right stood a high rocky hill  
crowned with very handsome Pine-woods; the  
strata of this rock were inclined  $30^{\circ}$  to the Ho-  
rizon in the direction of the river descending;  
this hill may be from 300 to 350 feet high: we  
have now frequently the hills touching the river  
on both sides ; a border or list of green Cane  
skirts the margin of the river, growing out of  
the alluvial soil, beyond is generally a high &  
sometimes barren hill. At  $2^{\text{h}}$  p.m. we passed a  
hill on the left containing a great body of blue  
slate, in some places hanging over the river ; a  
little farther came to another rapid or cataract,  
which appeared if possible more terrible than  
the

the last, the descent of the water was extremely precipitate ; from the very irregularly undulating surface, it was evident that the bottom was composed of innumerable fragments of rock, many of which just shewed their heads out of water ; we halted on the right shore & sent up our rope, but after many fruitless & some dangerous attempts, in which we were always repelled by the rocks, we were obliged to give up the expectation of passing up on that shore ; we therefore had recourse to the expedient of swinging the barge into the middle of the river & by the aid of the rudder and the exertions of poling, we with some difficulty got hold on the opposite shore, notwithstanding that the rope was caught under a rock in the middle of the river. We hauled the rope on board and sent it up the shore, and passed up the most violent part of the rapid : we ascended a second rapid of less importance and encamped, our people being almost exhausted with fatigue ; on the right is a creek called 'bayou de la saline' ; about a league up the Creek is a salt-lick, which by digging yields salt water resembling what we have already seen ; there is also blue slate near the same situation. This afternoon our hunters shot twice at a Buffalo & wounded him severely, the blood flowing as he run, but he escaped. Our tents were pitched on a stony and gravelly beach, they were completely paved with stones of a great

1804 } great variety in kind, color and size. Therm<sup>o</sup> at  
 December } 8<sup>h</sup> p.m. 36°—Extremes 36°—50°. Made only 4  
 miles 164 perches.

Wednesday 5<sup>th</sup> Therm<sup>o</sup> in air 23° in water of the river 47°  
 — very serene — calm — river fallen 2 inches.  
 The morning tho' cold was agreeable, the air  
 being very dry: all night we hear'd the roaring  
 of a Cataract, which we were to encounter this  
 morning; we were presently at the foot of it;  
 the violence of the rapid was about 100 yards  
 in length, & as I sat in the cabin of the barge  
 with my eye lowered to the level of the still  
 water of the reach above the rapid, I found  
 there was a fall of 4½ feet; we sent our rope a  
 head as usual; but made very little progress for  
 some time, the rope being entangled among  
 sharp rocks which endangered its cutting, the  
 consequence of which might have been fatal to  
 all on board the barge, with the entire destruc-  
 tion of the boat and every thing contained in  
 it; the passage was full of breakers and studded  
 all over with pointed rocks, so that it was neces-  
 sary to guide with the utmost care, to be able  
 to pass clear of those unfriendly obstacles: the  
 men on shore exerted themselves greatly, but  
 were frequently obliged to rest, & the boat was  
 often at an entire stand, at length the rope  
 escaped from the rock which bent it out of its  
 course, and we began to move up very slowly,  
 frequent

frequent rests were necessary & in about an hour and a half we ascended above the rapid which was only about 150 yards in length; a small island here divided the river into two channels, we took the shortest tho' the most rapid, because it was most favorable for the use of the rope: The french hunters have denominated this place 'La Cascade' on account of the rapidity & great fall of the water within so small a space: below the Cascade, we had rocky hills on both sides, the quality very hard freestone, but that found in the bed of the river which was rolled down by the floods from the upper countries, was very frequently of the hardest flint, sometimes resembling the Turkey stone. Being embarrassed upon the rapids we could not land to observe at noon. We were obliged to use the rope a second time to ascend a very impetuous rapid, altho' much inferior to that of the morning: at 1<sup>h</sup> 45' p.m. passed a creek on the right called 'fourche au Tigre' (Tiger creek) 4 computed leagues from the Chutes; it would seem that the Early Hunters have calculated their leagues by the time required to ascend the stream, & not by distance, as it appears from our calculation, that the distances passed over are frequently not above half those by computation: we now carry the rocky hills with us very often on both sides; rich bottoms nevertheless are not infrequent, & the upland is sometimes of moderate elevation

1804 }  
 December }  
 tion & tollerably level : we are informed that up  
 the fourche au Tigre, & other Creeks there are  
 many extensive tracts of rich level land. The  
 stones and rocks we now meet with are chiefly  
 penetrated along their fissures by sparry and  
 chrystraline matter. Last night a band of Wolves  
 howled in our neighbourhood a great part of  
 the night. Turkeys become now much more  
 abundant & less difficult of approach than be-  
 low, our hunters generally kill some every day.  
 The opposition on the river was to day so great,  
 that we made only 3 miles 128 perches, altho'  
 by the old computation our days voyage was  
 little short of 3 leagues. Therm: at 8<sup>h</sup> p.m. 38°  
 Extremes 23°-5°

Thursday 6<sup>th</sup> Therm: in air 45° in river water 48°—cloudy  
 —light wind at S.W. river fallen 2 inches. We  
 were encamped last night upon excellent land,  
 tollerably level, and of a good dark brown or  
 blackish soil at the surface, about 12 inches  
 deep, lying upon a yellowish loam ; the growth  
 of timber is large and handsome, chiefly a forest  
 of Oak with an admixture of ash, hickory, elm  
 &c, a field of corn has been formerly cultivated  
 here by one of the hunters during the summer  
 recess from hunting. This morning the Weather  
 being cloudy we apprehended rain, but hoped to  
 reach the 'fourche of Calfat' (Caulker's creek)  
 the point which is to terminate our navigation,  
 &

& encamp before bad weather ; we accordingly proceeded on without material interruption { 1804 December until the hour of breakfast, carrying with us high hills on the left and good level lands on the right, subject perhaps to be inundated : at 9<sup>h</sup> a.m. arrived at the foot of a very long precipitous rapid, it seemed to be divided into four steps, one of which was at least 15 inches perpendicular exclusive of the inclined plane above and below, the whole could not be less than 5½ feet perpendicular from the beginning to the end, which was about 400 yards, altho' the swift water continued half a mile : the rope was carried along the bank as usual, and many stops were made upon the rocks before coming to the great fall ; at last the barge entered between two high rocks, the men exerted themselves vigorously both on shore and aboard ; the barge appeared to be ascending an inclined plane of 12 or 15 degrees ; great exertions were necessary, she however passed without touching any other obstacle but the impetuous torrent and in a few seconds was drawn into moderate water to the infinite joy of the whole party ; upon another part of the rapid higher up, we got upon a rock, which seemed to serve as a pivot, upon which the boat turned as a Center ; after reiterated exertions, we could neither advance nor retreat, we therefore unloaded about one quarter of the cargo which enabled her to pass up

1804 } up without difficulty: we immediately re-loaded  
 December } having spent three hours in getting over this  
 rapid, and proceeded a quarter of a mile farther  
 to Ellis' Camp a little below the 'fourche au  
 Calfat' (Caulker's creek): Here terminates our  
 voyage upon the river upwards, for the pre-  
 sent. Our pilot considers this the most conven-  
 ient landing, from whence to transport by land  
 our necessary baggage to the hot-springs, the  
 distance being about three leagues. There is a  
 creek about 2 leagues higher up, called 'bayou  
 des sources chaudes' (hot-spring Creek) upon  
 the banks of which the hot springs are situated,  
 about 2 leagues only from its mouth, but the  
 road is very hilly and therefore less eligible than  
 the path from this camp or landing, which is  
 almost a level road. Upon ascending the hill to  
 encamp we found the land extremely level and  
 very good, with some plants in flower & a great  
 many evergreen vines; the forest is chiefly oak  
 with an admixture of other timber as before  
 mentioned: soon after we arrived it began to  
 rain, we were however tented before it com-  
 menced. Therm: at 8<sup>h</sup> p.m. 56° Extremes 54°—  
 67° Our short voyage this day was only 2 miles  
 32 perches.

Friday 7<sup>th</sup> Therm: before sun-rise 38° in river water 47°  
 Cloudy — Wind N.W. river risen 4 inches. In  
 the morning Doctor Hunter with the Pilot &c  
 went

went to view a salt-lick about a mile to the West of our camp but found no salt water ; the clay was extremely stiff and difficult to dig : after breakfast dispatched the Pilot with the greatest part of our people with their own baggage & some provisions to encamp at the hot-springs, hoping to find Cabins there sufficient to hut our party with orders to return early next morning so as to take out a load of more baggage and instruments. Took the sun's meridian altitude ; Latitude deduced  $34^{\circ} 27' 31'.5$  — Therm<sup>r</sup> at 3<sup>h</sup> p.m.  $50^{\circ}$  — the weather cleared up about 9<sup>h</sup> p.m. and became very serene and cool with wind at N.W. some venison and turkey were procured by the hunters : altho' we have frequently seen the tracks and other marks of buffalo, we are hitherto disappointed in killing any of them.

Therm<sup>r</sup> in air  $10^{\circ}$  in river water  $43^{\circ}$  — very Saturday 8<sup>th</sup> serene — light wind at N.W. river risen 4 inches. We found the weather this morning extremely cold, the therm<sup>r</sup> having fallen lower, than we expected in this latitude, particularly at the present early period of the winter season ; it is perhaps to be ascribed to the elevation of the country and neighbourhood of mountains : as we have no barometer with us to indicate the pressure of the atmosphere, we shall when we get to the hot springs, ascertain the degree of the

1804      } the thermometer at which water boils, from  
 December } which scientific men may draw their own con-  
 clusions respecting the elevation of the land.

At 10<sup>h</sup> a.m. our people returned from the hot-springs, each giving his own account of the wonderful things he had seen: they were unable to keep the finger a moment in the Water as it issued from the rock, they drank of it after cooling a little and found it very agreeable; some of them thinking that it tasted like Spice-wood tea. The people after refreshment were dispatched with another load of necessary baggage.

Took the Sun's meridian altitude again to day & found the latitude to be  $34^{\circ} 27' 27''$  being 4" less than yesterday; should no more observations for the Latitude be made here, we may consider it as fixed at  $34^{\circ} 27' 29''$ . The Therm: at 3<sup>h</sup> p.m. 47° We may prepare for another cold night: a flock of swans passed us to day: we have had an abundance of venison & turkey since we landed here, sufficient to supply the whole party with fresh provisions. The bank or hill upon which we are encamped is at least 50 feet perpendicular above the present level of the river, and therefore I presume 30 feet clear of inundation. Some hills of considerable height are in view, clothed with pine trees, but the lands around us extending far beyond our view, lie very handsomely for cultivation; the super-  
 stratum

stratum is of blackish brown color from 8 to 12 inches deep, lying upon a yellowish basis, the whole intermixed more or less with stone & gravel & fragments of blue schistus, which is frequently found so far decomposed as to have a strong aluminous taste. The therm: at 8<sup>h</sup> p.m. 26°; very serene and calm, the stars shone with uncommon lustre: in an hour more the face of the heavens was changed, a general cloud produced an intense darkness; the therm: rose to 36° and we expected snow or rain; after midnight notwithstanding, the clouds were dissipated, the face of heaven recovered its brightness & the Stars shone with undiminished splendor. Extremes of the therm: 10°-47°

Therm: in air 19° in river water 41° very Sunday 9<sup>h</sup> serene — Wind moderate at N.W. river risen 2 inches. The people returned from the springs between 9<sup>h</sup> & 10<sup>h</sup> a.m. and after some time given for repose and refreshment, the party set out again with such baggage as was immediately wanted, and Doctor Hunter and myself accompanied them; the people complained of the length of the road and weight of the loads, we therefore diminished the latter; The Sergeant and one private remained in care of the Barge and her stores. We left the river camp about noon and with many delays and haults for resting we arrived at the hot springs at 4½<sup>h</sup> p.m.—  
the

1804      } the distance is computed to be 9 miles, which  
 December } we shall verify by actual measurement, probably  
 on our return : the first six miles were in a general westerly direction with many sinuosities and the last three northerly, which courses were necessary to avoid crossing some very steep hills. We found on the way three principal salt-licks & some inferior, which are all frequented by buffalo, deer &c the soil around consisted of a white tenacious clay, probably fit for Potter's ware; hence the name 'Glaise' which the french hunters have bestowed upon most of the licks which are frequented by the beasts of the forest, altho' salt is not always to be found in such places so as to merit attention: we saw on the way recent tracts of the Buffalo and several Deer skipped along before us; we did not follow the game, being desireous of arriving at our destination before evening. The people were much fatigued with this days labor, altho' the road is by no means bad or hilly, but there is no doubt that a heavy load constantly bearing a man down must be very fatiguing upon the best of roads: the time and difficulties of moving our small baggage and provisions, altho' nothing but what is essentially necessary, to so small a distance, naturally sugests the inconveniencies which must arise in transporting over unknown mountains between the sources of the red and Arcansa rivers, baggage & provisions indispensibly necessary,

cessary, with tools and implements for the construction of a boat or boats to descend the 2<sup>d</sup> river. Soldiers accustomed to carry moderate loads only, would find it intollerable to transport burthens which would be thought light by a Canadian or other woodsman enured to such hardships: a little calculation will shew what ideas we ought to form upon this subject. The provisions, instruments, arms & other baggage which may be deemed indispensible for 15 persons engaged on such an expedition, i. e. what must be transported from the head of one river to the commencement of navigation on the other, are certainly not over-rated at 3000 lib; of the whole party 10 carriers are the highest number we can calculate upon, some being necessary to guard the two camps while the scientific persons unattended would explore the environs: those 10 carriers from what we have seen could not be expected to carry for a number of days successively more than 50 pounds each (several of our people were incapable of doing so much) and ten miles to go loaded & return empty day after day even on a tollerably level road, is perhaps beyond what we can flatter ourselves with accomplishing; thus it would require at least six days to transport the baggage 10 miles, and the seventh would be demanded as a day of repose: now if the heads of navigation should be only 50 miles apart, & the passage not rugged

1804      } rugged or mountainous, it would require at the  
 December } least 35 days to pass along the unknown region ;  
 and if allowance be made for such difficulties as  
 ought to be expected including bad weather, we  
 shall perhaps still flatter ourselves, if we expect  
 to complete this portage in 50 days : on due con-  
 sideration therefore it may be more advantageous  
 (if the expedition is to be carried on by soldiers  
 who cannot travel without their rations, tents,  
 baggage & above all their execrable whisky) to  
 explore one river only at a time. When arrived  
 at the head of Navigation which will constitute  
 a kind of head quarters and point of departure,  
 the scientific men with a sufficient party may  
 make with tollerable convenience excursions of  
 30, 40 or 50 miles in all directions, prolonging  
 the time according to the fortune of procuring  
 game, which will enable the party to reserve the  
 provisions taken from Camp for their return : an  
 advantage resulting from this plan would be the  
 facility of transporting specimens of natural his-  
 tory meriting attention ; it is evident that this  
 benefit must, upon the other plan, be nearly given  
 up excepting on the descent of the second river.  
 I am not ignorant that the plan originally pro-  
 posed may be carried into effect, but this must  
 be done by persons chosen for the object, in order  
 that it may be done with economy & in a rea-  
 sonable time: Two young men of science of  
 robust constitutions attended by four Canadian  
 or

or other woodsmen inured to fatigue and who  
can depend altogether on their guns for subsistence  
may accomplish this object; they will be  
able to transport at once, their blankets, their  
arms and ammunition, a little parched meal, very  
light instruments, such as a 3 inch sextant which  
may be graduated to 20" of a degree, a pocket  
case with a few re-agents for mineralogical as-  
says, and 3 or 4 days provisions in case of disap-  
pointment in finding game; (spirituous liquors  
must be out of the question :) Such a party, each  
carrying a light ax for the purpose of building  
Canoes &c may accomplish the object proposed,  
upon supposition that no hostility is to be ap-  
prehended from the natives.

From the river camp for about two miles,  
the lands are level and of second rate quality,  
the timber chiefly oak intermixed with others  
common to the climate and a few scattering  
pine-trees; further on, the lands on either hand  
arose into gently swelling hills, clothed chiefly  
with handsome pine-woods: the road passed  
along a valley frequently wet, by numerous rills  
and springs of excellent water which broke from  
the foot of the hills: as we approached the hot-  
springs the hills became more elevated and of  
steep ascent & generally rocky; those hills are  
here dignified by the name of mountains, altho'  
none of those yet in view exceed 4 or 500 feet;  
it is said that mountains of more than five times  
the

1804      } the elevation of these hills are to be seen in the  
 December } North-west towards the sources of the Washita  
 river ; one of those has been called the glass,  
 Chrystal or Shining mountain, on its surface is  
 to be found vast numbers of large hexagonal  
 prisms of very transparent colorless chrystal, gen-  
 erally surmounted by pyramids at one end, rarely  
 at both ; they do not produce a double refrac-  
 tion : many searches have been made over those  
 mountains for the precious mettals, but hitherto  
 without success, so far as I can learn.

We found at the Hot-springs an Open Log-  
 Cabin and a few huts of split boards, all calcu-  
 lated for summer encampment, & which have  
 been erected by persons resorting to the Springs  
 for the recovery of their health ; we shall en-  
 deavour to render our temporary lodging com-  
 fortable for the people and ourselves during the  
 short time we expect to stay here : we are a  
 little discouraged by the dilatory ways of the  
 Soldiers ; it is evident that to promote the ad-  
 vancement of an object similar to ours, they  
 ought to be commanded by a commissioned  
 officer, whose manners and disposition would  
 render him an agreeable companion to his fel-  
 low laborers : it cannot be said that the Soldiers  
 are disobedient, on the contrary they are to me  
 uniformly respectful, but it sometimes appears  
 that a spur is wanting, & there is no person here  
 who treats them otherwise than with civility ;  
 there

there is also some appearance of design to pro-  
long their return to new-orleans, the present { 1804  
service being much more agreeable to them  
than the duty of a garrison under the eye of  
their officer.

On our arrival we immediately tasted of the hot-spring water, that is, after a few minutes cooling, for it was impossible to approach it with the lips when first taken up, without scalding: having arrived here without prejudice for or against the springs I did not discover any other taste except that of very good water rendered hot by culinary fire; some of our people pretended to have discovered cathartic properties, which must be feeble, as I have been unable to detect the existence of such a quality in the waters. Therm: at 8<sup>h</sup> p.m. 28° Extremes 19°-42°.

Therm: 26°— very serene. Wind moderate at Monday 10<sup>th</sup>  
N.W.— We spent a cold night in our new lodgings, not being able to keep up a large fire in the Cabin, which is only 12 feet square without a chimney. From the complaints of great fatigue by the people, we found it necessary to allow some repose, and ordered the people to go into the river camp, there to remain during the night and return the day following with more of our baggage, directing the loads to be made still lighter: the day proved serene and fine, but as we had been obliged to leave our instruments

1804 } struments yesterday at the river-camp, no astro-  
 December } nomical observations could be made this day.

We visited all the hot springs ; they issue from the sides and foot of a hill placed on the east side of the narrow valley where we are huttred, one small spring only rises out of the face of the west bank of the creek ; from the quantity of calcareous matter deposited by it it does not appear to be of long standing ; a natural conduit probably passes under the bed of the creek to supply it. There are four principal springs arising immediately on the east bank of the Creek, one of which may rather be said to spring out of the gravel bed of run ; a fifth smaller one is that just mentioned rising on the west side of the creek ; a sixth of the same magnitude is the highest or most northerly one rising near the bank of the Creek ; those are all the sources which merit the name of springs near to our huts ; but there is a considerable one some distance below, & all along the creek at intervals the water oozes out or drips from under the bank into the creek, which during the present cool season is very evident from the condensed vapor which floats along the margin of the Creek, where those drippings are visible & even where none is to be seen ; a statement will hereafter be given of the temperatures of the respective springs with the quantity of water delivered and references to their respective positions ; from

from some slight trials, it appears that the highest temperature is about  $148^{\circ}$  to  $150^{\circ}$  of Farhenheit's thermometer. { 1804 December }

In the afternoon we ascended the hill of the hot springs, it is of a conical form terminating at top with a few loose fragments of rocks covering a flat space of twenty five feet diameter: altho' we have said the hill is conical, yet it is not entirely insulated, for it is connected by a very narrow ridge with the neighbouring hills.

The primitive rock of this hill above the base is chiefly Silicious, some part of it being of the hardest flint, others of the nature of freestone extremely compact & solid, and of a great variety of colors; the base of the hill, & indeed for a considerable extent, is composed of blackish blue schistus, which divides into perpendicular laminæ like blue slate; The water of the hot springs is therefore delivered from the siliceous rock, but this is generally invisible at the surface, being encrusted by or rather buried in the mass of calcareous matter, perpetually precipitated from the water; iron in small proportion was also deposited in form of a red calx, the colour of which was frequently distinguishable in the lime.

Under the hottest water we observed a lively green appearance, which at first induced us to suppose that copper might be present, but on closer inspection, we found it to be a soft tender matter,

1804 } matter, perhaps a feculum deposited by the water;  
 December } it may possibly be of the same nature with the  
 green matter found in conduits or even in well  
 buckets under pure water at common tempera-  
 ture, respecting which a dispute arose (I think)  
 between Doctor Priestly and other Philosophers,  
 whether this green mater is a perfect vegetable  
 or only a feculum; the question is perhaps now  
 decided (if we suppose the green matter of the  
 hot springs to be of the same kind) for by rea-  
 soning from analogy, no vegetable can be sup-  
 posed to exist in the temperature of  $150^{\circ}$ ; but  
 we must beware of presuming to set bounds to  
 the powers of Nature: we shall hereafter ex-  
 amine this matter with due attention; we shall  
 only now observe, that this substance seems to  
 be deposited by successive thin laminæ.

As we advanced up the calcareous region of  
 the hill, we discovered several patches of rich  
 black earth, which appears to be formed by the  
 decomposition of the calcareous matter: in other  
 situations appeared an incrustation of limestone,  
 i. e. the superficial earth was penetrated, indur-  
 ated and encrusted by lime with fine laminæ or  
 minute fragments of iron ore: we entertained  
 no doubt that the water of the hot springs had  
 here issued formerly from the hill and run over  
 the surface, and that the entire mass of the cal-  
 careous rock to the height of one hundred feet  
 perpendicular has been created by the incessant  
 depositions

depositions of the hot springs; in this high situation we found a spring whose temperature is  $140^{\circ}$   $1804$   
December

After passing the calcareous region, we found the primitive hill covered by a forest, whose trees were not of the largest size; they consisted chiefly of Oak, Pine, Cedar, Holly, hawthorn with many others common to the climate, with a great variety of vines, some said to produce black & some yellow grapes, both excellent in their kinds: the soil is extremely rocky, interspersed with gravel, sand & fine black vegetable mold. When we had advanced about 250 feet perpendicular up the hill, we found a change in the soil; it was equally stoney & gravelly as below with a superficial coat of black mold but immediately under the last was found a basis of fat, tenacious, soapy, red clay, inclining to the colour of bright Spanish snuff; it seemed to be very homogeneous with scarcely any admixture of sand and no saline taste, but rather soft and agreeable; the same timber continues but diminishing in size as we ascend the hill, and rocks increasing to the top: We estimate the whole height of the hill to be about 300 feet above the level of the valley where we are huddled. Therm: at 8<sup>h</sup> p.m.  $28^{\circ}$  Extremes  $26^{\circ}$ – $50^{\circ}$

Thermometer before sun-rise  $48^{\circ}$  Wind S.E. Tuesday 11<sup>th</sup>  
The weather changed very much in the night;  
it

1804 } it became much warmer and the heavens were  
 December } overcast with one general cloud; the air was  
 still damp and penetrating, and our mansion per-  
 vious to the chilling blast, but we made good  
 fires and comforted ourselves in the expectation  
 of favorable weather to enable us to complete  
 our observations and researches. The People ar-  
 rived about one o'clock in the afternoon with a  
 few things including the instruments.

At 3<sup>h</sup> p.m. the thermometer rose to 59° and  
 in the evening at 8<sup>h</sup> fell to 50°, the weather be-  
 ing still disagreeable and cloudy. Some venison  
 was brought in after dinner — The People five  
 in number went back to the river to fetch tools  
 and necessaries, while others were occupied in  
 raising a log-chimney at the end of our Cabin,  
 which we proposed to line with stone as a se-  
 curity against fire. No change in the appearance  
 of the weather at bed-time. Extremes of the  
 therm: 48°—59°

Wednesday 12<sup>th</sup> Thermometer before sun-rise 36° The weather  
 has become colder, but still continues overcast,  
 damp and disagreeable, the wind being about  
 north, a few drops of rain fell last evening &  
 during the night. As it still continues cloudy, no  
 astronomical observations could be made, I there-  
 fore occupied myself in the forenoon in bringing  
 up and completing my journals, and in the after-  
 noon went to examine all the hot springs with  
 the

the thermometer: four principal springs seemed only to merit attention; those which yielded the greatest quantity of water were of the highest temperature and are in the following order. N° 1 — 150° N° 2 145° — N° 3 — 136 and N° 4 132° the last in order is the only one on the west side of the creek and I did not perceive any signs of hot water anywhere else on that side of the Creek, I therefore conceived that the spring N° 4 is supplied by a channel under the Creek from the general reservoir in the hill on the East: at the spring N° 3 was a small basin of some little depth, in which was a considerable quantity of the green matter in temperature 134° it had much the appearance of a vegetating body, being detached from the bottom yet connected by something like a stem which rested in Calcareous matter, the body of one of those pseudo-plants was about 4 to 5 inches diameter, the bottom a smooth film of some tenacity & the upper surface divided into ascending fibres of  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch long resembling the gills of a fish, formed into a kind of transverse rows; not being then prepared for a more minute investigation, a future examination will be made with the microscope. Should it prove that this is a vegetable production and not an accumulation caused by precipitation, it will be a new proof of the wonderfull powers of nature in the production of animal & vegetable life in temperatures

1804 } peratures which have been hitherto thought sufficient to extinguish the vital principle: Should December } this green matter prove to be vegetable, I shall confidently expect the discovery of animal life; for no plant I believe upon due research will be found without its animal inhabitant. A little farther on, we came to another small muddy basin, in which a vermes about  $\frac{1}{2}$  an inch long, was moving with a serpentine or vermicular motion, the water was found a little warm to the finger: I observed invariably that the green matter forming on stones & leaves covered a stratum of Calcareous Earth, sometimes a little hard & brittle, but at other times soft and imperfect, but whether the lime favors the production of the green matter or vice versa, we probably shall not have time to ascertain. Therm<sup>o</sup> at 8 p.m. 36° Extremes 36°-50°

Thursday 13<sup>th</sup> Therm<sup>o</sup> before sunrise 26° Wind north. The weather still continues cloudy, dark and disagreeable; finding no probability of making any astronomical observations this day I determined to make an excursion upon the neighbouring western mountain, and having gained one of its summits about  $\frac{1}{2}$  a mile from the Camp, took various courses of Hills & points on the river, & having gone to its extreme summit to the westward about a mile distant, I took courses to the same points in order to ascertain nearly their positions:

We

We had several fine prospects from this hill, { 1804  
which we estimated to be 300 feet higher than { December  
the valley of the hot Springs where we first as-  
cended, and 400 feet at its western extremity;  
the valley of the Washita river comprehended  
between the hills on either side, seemed a per-  
fect flat & about 12 miles wide, on all hands we  
saw the hills, called here mountains rising be-  
hind each other: in the direction of north the  
most distant were supposed to be 50 miles off,  
& are considered to be those of the arcansa river,  
the rugged mountains which divide the waters  
of the arcansa from those of the Washita prevent  
the Osage Indians from visiting the Washita  
river, of whose existence they are in general  
ignorant; were it otherwise, their excursions  
here, would prevent this place being visited by  
White persons or even Indians of other tribes,  
as they make no difficulty of traveling round the  
mountains which give birth to the Washita by  
the great prairies, which lie east of the great  
dividing Ridge, and it is known that those rob-  
bers plunder indiscriminately all they can find.  
In the direction of S.W. we saw at about 50 miles  
distance, a ridge perfectly level which we sup-  
posed to be the high prairies or planes of the red  
river, so that we had under our Eye an horizon  
whose diameter was 100 miles, incomplete to the  
East & N.W. Notwithstanding the late severity  
of the weather, we found along the ridge a con-  
siderable

1804 } siderable number and some variety of plants in  
 December } flower, & others retaining their verdure, We found indeed the ridge much more temperate than the valley; When we left the valley it was extremely damp, cold and penetrating; upon ascending the ridge, the atmosphere became dry & mild, so that walking thereon was perfectly agreeable: a few of the plants in flower were collected for specimens, but what surprised us much was to find upon this ridge a species of Cabbage, the plants grew with expanded leaves spreading on the ground, of a deep green with a shade of purple, the taste of the cabbage was plainly predominant with an agreeable warmth inclining to the raddish; several tap-roots penetrated into the soil, of a white colour, having the taste of horse raddish, but much milder; a quantity of them were brought to camp & when dressed proved palatable & mild; it is highly improbable that any Cabbage seed has ever been scattered upon this ridge, the hunters ascending this River have always pursued far different objects; we must therefore consider this Cabbage (untill farther elucidation) as indigenous to this sequestered quarter & may be denominated the Cabbage raddish of the Washita. I shall preserve and take with me several living plants in hopes of procuring in due time seeds from which the curious may be furnished. We also found growing here a plant which is now green, called by the

the French 'racine rouge' (red root) which is { 1804  
said to be a specific in female obstructions, it has { December  
also been used combined with the china root to  
die red, which last probably acts as a mordant:  
having understood that it has also been used with  
the bark or root of an aromatic Vine, (which I  
shewed to M<sup>r</sup> Bartram at Baton Rouge) for the  
same purpose of fixing a red die. The top of  
this ridge is in a manner crowned by rocks of a  
flinty kind. So very hard as to be improper for  
gun flints; when applied to that purpose, it very  
soon digs out cavities in the hammer of the lock.  
This hard stone is generally white but frequently  
clouded with red, brown black & some other  
colours, and no doubt in the hands of a practical  
mineralogist, would receive a variety of denomina-  
tions such as agate, jasper, calcedony, Carne-  
lian & perhaps some of the adamantine genus.  
Notwithstanding the abundance of rock, a great  
deal of excellent black vegetable earth was found  
along the ridge, and generally an understratum  
of darkish or greyish brown earth producing  
oak & Hickory with other woods & a great  
number of grape vines, said to yield excellent  
black grapes, there is no doubt that this soil upon  
the top & sides of these hills is well adapted to  
reward the labors of an expert Vigneron. Here  
& there we met with fragments of Iron stone  
& often where a tree had been overturned by the  
roots, some schistose stones were brought to view  
which

1804 } which were suffering decomposition by their  
 December } exposure to the atmosphere; in returning we  
 descended the hill obliquely & found for 200  
 feet perpendicular the same kind of stone, much  
 broken into loose fragments, and slipping under  
 foot frequently endangered our falling, the hill  
 being in many places extremely precipitous: in  
 this position we dug into the side of the hill  
 and found the 2<sup>d</sup> stratum to consist of a reddish  
 Clay somewhat resembling that found near the  
 top of the Conical hill to the East of our Camp,  
 but not so highly coloured nor so argilaceous,  
 the proportion of silex being manifestly much  
 greater. We continued to descend and found at  
 $\frac{2}{3}$  of the hill downwards, the rock to alter con-  
 siderably. & altho' it still continued siliceous, yet  
 it was rather a very hard freestone mixed with  
 fragments of flint which had probably rolled  
 from above, descending still lower we found a  
 blue schistus, in a state tending to decomposition  
 wherever it was exposed to the atmosphere;  
 more interiorly the schistus was hard resembling  
 coarse Slate. Few other argilaceous stones pre-  
 sented themselves to view, the siliceous were al-  
 ways predominant; & we often found what had  
 much the appearance of the Turkey oyl-stone.  
 Towards the base of the hill was a considerable  
 expansion of tollerably good land, lying suffi-  
 ciently level for cultivation and is supposed to be  
 a good soil for wheat. The timber such as above  
 described

described with a large proportion of Pine. { 1804  
 Therm<sup>°</sup> at 8<sup>h</sup> p.m. 30° Extremes 26°—40° wind { December  
 North.

Therm<sup>°</sup> 28° Wind N.E. Cloudy, dark, cold Friday 14<sup>th</sup>  
 and sleet— This morning has made no improve-  
 ment upon the weather ; rain & sleet fell in the  
 night & the ground is hard frozen. D<sup>r</sup> Hunter  
 had proposed an excursion into the mountains  
 with a Party this day, but the appearance of the  
 weather forbids it : the bad state of our mansion  
 calling for further repairs in the present severe  
 weather, we employed some of our people in  
 shutting up the cracks and openings between the  
 logs, which will render our dwelling more com-  
 fortable ; placed some of the flowers collected  
 between hortus-siccus-paper and had the roots  
 of the new Cabbage planted so as to be preserved  
 until our return.

The day continues to drip a little from time  
 to time, being still dark, damp and disagreeably  
 cold. Therm<sup>°</sup> at 8<sup>h</sup> p.m. 32° Extremes 28°—  
 40° We have news from the Sergeant that the  
 river has fallen 5 feet.

Therm<sup>°</sup> 26° Wind N.W. strong. The morn- Saturday 15<sup>th</sup>  
 ing was cloudy, but less dark and disagreeable  
 than the day before. The air became drier and  
 the clouds were dissipating by 9 & 10 o'clock ;  
 prepared for a meridian observation ; the wind  
 blew

1804 } December } blew very strong down the valley, we are here  
 placed as in a point of convergence; for whether  
 the wind blows directly or obliquely into the  
 valley from above or below, it is reflected from  
 the faces of the hills on one hand & by three  
 lesser vallies on the other so as to have its force  
 directed against this point as a Center; there  
 will therefore be a breeze here when there is  
 none upon the adjoining hills, perhaps the rare-  
 fraction produced by the hot Springs may also  
 contribute in some measure at this season. At  
 noon had an observation altho' much disturbed  
 by the frequent recurrence of violent blasts of  
 wind which greatly agitated the mercury of the  
 artificial horizon; it appears that the Lat. here  
 will be about  $34^{\circ} 31'$ , but as I intend to make a  
 short series of observations with the face of the  
 Instrument both East & west, the final result  
 will then appear. Therm<sup>o</sup> at 3<sup>h</sup> p.m.  $32^{\circ}$  at 8<sup>h</sup>  
 p.m.  $30^{\circ}$

Sunday 16<sup>th</sup> Therm<sup>o</sup>  $21^{\circ}$  Wind moderate N W this  
 morning is cold but promises fine weather, the  
 wind nevertheless arose at 9 o'clock & continued  
 to blow strong all day. Prepared for astronomi-  
 cal observations. Took corresponding equal alti-  
 tudes of the Sun with corresponding azimuths  
 before & afternoon, with the help of a common  
 circumferenter, by which it appears that the  
 magnetic variation is  $8^{\circ} 20'$  East; this being  
 about

about the expected variation, we may conclude, { 1804  
that the needle is not here influenced by any December  
local attraction Took also equal altitudes for the  
regulation of the watch before & afternoon.  
Took also the Suns mer. alt. with the face of  
the Instrument reversed, and in the Evening be-  
tween 10 & 11 o'clock, the Therm<sup>o</sup> being at  
22° perfectly serene & calm, took 9 lunar dis-  
tances between the moon's east limb & a Arie-  
tis; the evening was perfectly agreeable & not  
sensibly cold altho' the Therm<sup>o</sup> was so low; I  
conclude these observations to have been made  
with great accuracy from the advantages of the  
circumstances, the Circle was mounted on its  
pedestal very firmly, the Star towards the west  
& the moon over head so that when both were  
brought into the field of view & the Star made  
to move gently across the limb of the moon by  
a turn of the foot screw backwards & forwards,  
or by sliding the foot a little to the right & left  
so as to discover the true point of contact on the  
moon's limb, the Star being left a little open,  
the observer had only to wait with his eye fixed  
on a permanent steady object untill he was con-  
vinced of the contact being perfect; I consider  
one observation made in this way superior to any  
number or set of observations made by an in-  
strument supported upon the arms of the most  
experienced observer; I would therefore recom-  
mend to all persons using a Sextant or reflecting  
Circle

1804. December } Circle by land, to adopt a pedestal of support with the three necessary motions ; the superiority is so great that he who has accustomed himself to use the one mode cannot reconcile himself to the manifest imperfection of the other ; the observation being made the angle is read off without stirring the Instrument, so that every thing is ready fixed to the eye for the next observation ; I perceive that when all things are favorable a set of distances may be taken by the difference of 1' of a degree precisely between the observations ; i. e. by moving the index before making the observation, exactly one minute in advance, so that it may be written down by the assistant before the time of counting Seconds : this will operate as a check also upon the negligences of young assistants, a mistake in minutes of time would thus be easily detected ; this mode I shall follow in future, as being easier and more perfect : Therm<sup>o</sup> at 8<sup>h</sup> p.m. 22° Extremes 21°-34°

Monday 17<sup>th</sup> Therm<sup>o</sup> before Sun rise 26° wind moderate N.W. The morning is bright & promises a fine day. Yesterday Doc<sup>r</sup> Hunter made an excursion into the mountains, & to day he goes again. He discovered nothing of importance hitherto, the only metal of which we have seen any indications has been Iron, the ore of which is scattered about in small fragments upon the hills and in the

the water courses. Prepared for observation — 1804  
{ December took equal altitudes of the Sun before & afternoon to correct the watch, which compared with the result of yesterday's equal altitudes will give the rate of the watch's going, by which the true time of the Lunar observations will be precisely ascertained: took the Sun's meridian altitude with the face of the Instrument again reversed: prepared to observe the distance of the moon from Aldebaran, expecting fine observations from so bright a Star, but we were disappointed, the evening become hazy, the Stars frequently obscured, and a large halo with a broad white brim appeared around the moon. The night became cloudy & some drops of rain or sleet fell. appearance of bad weather for to morrow Therm<sup>°</sup> at 8<sup>h</sup> p.m. 28° Extremes 26°-42°

Therm<sup>°</sup> 34° wind north, Cold, damp, disagreeable. The appearance of the weather prevents D<sup>r</sup> Hunter from making another excursion to day, some rain fell in the night, but the aspect of this morning bespeaks snow or sleet. Having no better occupation in the present state of the weather, I brought up my journals and began to form a list of all the vegetables I had seen here and in the neighbourhood upon the River which will be inserted in this journal when made a little more complete; The day continues dark, cloudy & rainy: in the afternoon it began to hail

1804 } hail & in the evening it snowed pretty fast;  
 December } about 8<sup>h</sup> p.m. it was 3 inches thick; Therm<sup>°</sup>  
 at the same hour 32° Extremes 32°-36°

This evening Doc<sup>xt</sup> Hunter was very much indisposed but was relieved before bed time.

Wednesday 19<sup>th</sup> Therm<sup>°</sup> 30° wind in the valley West, but changeable; This morning we have a full prospect of a northern winter, the ground is covered 4 inches deep with snow and it continues from time to time to fall, tho' not remarkably fast, the eves of our Cabin hang with beautiful icicles, which we have the pleasure of admiring thro' the logs as we sit by the fire side: out-door business being out of the question, I continue to augment my list of vegetables from memory & with the help of the pilot, who proves to be tolerably intelligent. The Doctor has been unable to discover any thing in the water of the hot springs except some weak acid which is probably carbonic; the water has been from this cause a little hard & therefore not so proper for washing, as the soap is decomposed in some measure: the same state of the weather continues, the therm<sup>°</sup> at 3<sup>h</sup> p.m. being at 30° and at 8<sup>h</sup> p.m. 28° at bed time the weather still continues dark and threatening more snow.

Thursday 20<sup>th</sup> Therm<sup>°</sup> 30° wind in the valley west. There appears over head driving light clouds from the N. W.

N.W. The snow still continues lying on the ground, the night was very cold, but has greatly softened towards morning, from appearances we expect a thaw, it becomes a little clearer. The D<sup>r</sup> and myself both a little indisposed probably from cold & wet feet and the inclemency of the weather; after breakfast, some hopes of the clouds dissipating. The Sun has shewn himself thro' the veil of clouds for a moment, Prepare for observation but disappointed the heavens are again completely veiled in clouds and a thaw comes on, the Therm<sup>°</sup> being at 36° at 3<sup>h</sup> p.m. Engaged writing great part of the day. Examined some water of one of the hot springs, which stood a little stagnated on one side, its temperature 132° found no living animal in it, by the aid of an excellent microscope examined also some of the green matter and the white coagulum lying under it which I shall further prosecute with day light, being unable yet to determine whether the green matter is vegetable or merely a feculum. Therm<sup>°</sup> at 10<sup>h</sup> p.m. 32° The weather continues cloudy & the snow lies upon the ground the thaw having stopped.

Therm<sup>°</sup>, 32° Wind N. No favorable change Friday 21<sup>st</sup> as yet in the weather; cloudy, damp, dark & cold, the snow still lies upon the ground, so that the D<sup>r</sup> is unable to undertake another more considerable excursion as he intended. We were in

1804 } in hopes also of making another set of astro-  
 December } nomical observations for the Long. of this place,  
 but as the time is now much advanced we shall  
 be desirous of getting away as soon as the weather  
 permits the transport of our baggage: — in the  
 meantime the Doctor is desireous of making  
 another excursion while we are preparing to  
 move: observed a spot of ground on the same  
 side of the creek with the hot Springs, covered  
 with herbage which had not lost but partially its  
 verdure; upon this spot no snow lay, it appeared  
 to thaw as soon as it fell, altho' on other places  
 even very near some of the hot springs the snow  
 remained undissolved; as soon as the weather  
 permits I shall examine this ground and ascer-  
 tain the temperature which resists the rigours  
 of winter: what a fine situation for a green or  
 hot house, where at a small expence all the  
 tropical fruits may be propagated. Therm<sup>at</sup> at 3<sup>h</sup>.  
 p.m. 36° it has rained a little we were in hopes  
 of seeing the snow carried away, that it might  
 afterwards become dry under foot: yesterday  
 our pilot & some of the people went out a hunt-  
 ing & fell in with some buffalo; two of them  
 were shot at and grievously wounded, the blood  
 streaming from their sides as this happened in  
 the evening they were unable to follow the  
 chase, but returned to the pursuit this morning,  
 they discovered the tracks and blood which they  
 followed great part of the day without com-  
 ing

ing up with the buffalo & were obliged to re- { 1804  
turn without success ; it appears that the great { December  
strength of this animal enables him to carry off  
on many occasions several shots without falling,  
it is necessary to shoot him thro' the heart to  
make him fall speedily ; we are told that a rifle  
bullet is by no means certain (if ever so well  
directed) of penetrating thro' the scull into the  
brain, or if it does, provided the ball only reaches  
into the front or fore part of the brain, the an-  
imal will not fall ; some even assert that the  
thickness and strength of the scull with the im-  
mense quantity of hair which covers the head  
of the buffalo will resist the penetration of an  
ordinary rifle bullet. Some venison was brought  
in so that we are never without fresh provisions.  
The Turkeys are not plenty in this neighbour-  
hood, keeping near the river. Found a myrtle  
wax tree covered with its fruit, which must  
have hung since July or August, the wax is no  
longer green having changed its colour to a  
greyish white by being so long exposed to the  
atmosphere ; examined the berries with the mi-  
croscope ; the whole berry is a little oval and  
less than the smallest garden pea, the nucleus or  
real seed is as large as a radish seed covered all  
over with a number of brownish kidney shaped  
glands of a brown colour & sweetish taste, those  
glands secrete the wax, which completely en-  
velopes them & gives the whole the appearance  
at

1804 } at this season of an imperfectly white berry ;  
 December } this is a valuable plant and merits cultivation ;  
 its favorite position is a dry soil rather poor &  
 looking down upon the water, it is excellently  
 adapted to ornament the Margins of Canals,  
 lakes or rivulets ; the Capina Yapon is equally  
 beautiful & proper for the same purpose. It  
 grows here along the banks of this stoney Creek  
 intermingled with the myrtle, and bears a beau-  
 tiful little red berry very much resembling the  
 red Currant. Therm $^{\circ}$  at 8<sup>h</sup> p.m. 31°

Saturday 22<sup>nd</sup> Therm $^{\circ}$  31° wind N. dark & cloudy, the Snow  
 continues upon the ground. without any pros-  
 pect of favourable change ; after breakfast it be-  
 gan to rain, the water the rain froze as it fell  
 upon the branches of the trees, many limbs broke  
 down around us in consequence of the weight of  
 the Ice adhering to them; we are still confined  
 within doors by the inclemency of the weather  
 which greatly retards us, so that we cannot even  
 prosecute our intended researches respecting the  
 hot springs. Engaged writing great part of the  
 day ; we had 10 quarts of the hot spring water  
 evaporated which produced about 10 grains of  
 matter, of which the chief part appeared to be  
 carbonated lime with some feculum, the greater  
 part dissolved with effervescence in the muriatic  
 acid. The Therm $^{\circ}$  at 3<sup>h</sup> p. m. 36° The day  
 continues unfavorable & keeps dropping rain  
 from

from time to time, yet the snow does not melt: 1804  
December  
The temperature of the hot springs remains the same as in the former trial & the temperature of boiling water was ascertained to be  $212^{\circ}$ ; hence it appears that this place is not elevated so as sensibly to alter the pressure of the atmosphere, otherwise water would boil at a smaller temperature. Caused a number of the grape vines to be dug up ready to carry along with us. The Doctor goes on with some more experiments upon the Spring water, the results will be hereafter given. Therm $^{\circ}$  at 8<sup>h</sup> p.m.  $34^{\circ}$  Snow falls again this Evening — no prospect of a change.

Therm $^{\circ}$  before sunrise  $30^{\circ}$ . Wind N.W. by Sunday 23<sup>rd</sup> the clouds. blows down the valley reflected from the side of the hill N.N.E; this morning some appearance of a change. The clouds (scudding from the N.W.) begin to dissipate, the blue celestial Sky appears in several parts of the heavens. The snow still lies partially on the ground — but we hope it will soon dissolve as the Sun appears; prepare for taking equal altitudes in which I succeeded so far as to take the triple contact in the morning for the regulation of the watch and also one azimuth with time & altitude for finding the variation of the magnetic needle; prepared for a meridian observation in order to complete my set of 4 observations for the Latitude of this place, but was disappointed by

1804 } by the intervention of Clouds ; seeing no pros-  
 December } pect of taking correspondent altitudes in the  
 afternoon determined on visiting the hot springs  
 & adjacent places : It requires a length of time  
 to form a good judgement of a new object, such  
 as the curious one now before us, on the first  
 view we see a creek with a margin of rock &  
 the hot springs here and there trickling over or  
 passing thro' them ; the Creek seems to be un-  
 dermining the rock, which frequently cracks,  
 divides and falls into the Creek ; upon a closer  
 examination it will be found that the water of  
 the Creek does not undermine the rock, but on  
 the contrary the rock is continually encroaching  
 upon the breadth of the creek ; the hot water  
 is perpetually depositing calcareous matter, per-  
 haps some siliceous matter also : the new formed  
 rock by those means is continually augmenting  
 & projecting its cliffs and promontories over the  
 running water, which prevents this formation  
 below its own surface : wherever the calcareous  
 crust is seen spreading over the bank & margin  
 of the Creek, there most certainly the hot water  
 will be found, either passing over the surface or  
 thro' some channel perhaps below the new rock,  
 or dripping from the projecting edges of the  
 over-hanging precipice ; the progress of nature  
 in the formation of this new rock is curious &  
 worthy the attention of the mineralogist ; when  
 the hot water issues from the fountain it fre-  
 quently

quently spreads over a superficies of some extent ; { 1804  
so far as it reaches on either hand there is a de- { December  
position of dark green matter which may either  
be a plant or only a feculum, I have not yet  
been able to pronounce which, several laminæ  
of this green matter will be found lying over each  
other; immediately under and in contact with  
the inferior lamina which is not thicker than  
paper is found a whitish matter resembling a  
coagulum; when viewed with the microscope,  
this last is also found to consist of several, some-  
times a great number of laminæ, of which that  
next the green matter is the thinnest and finest  
being the last formed, those below encreasing in  
thickness & tenacity, until the last terminates on  
a soft earthy matter, and this last reposing on  
the more solid rock; each lamina of the coagu-  
lum is penetrated in all its parts by calcareous  
grains which are extremely minute and divided  
in the more recent web but much larger and  
occupying the whole of the inferior lamina; I  
think it probable that the coagulum is silex and  
no doubt the grains are lime the under stratum  
is continually consolidating & adding bulk and  
height to the rock; when this acquires a certain  
elevation the water always seeking the quickest  
descent will find its way over another part of the  
rock, hill or margin of the creek & forms accu-  
mulations by turns over the whole of the adjacent  
space; the green matter is also designed by nature  
for

1804 } for a useful purpose ; when the water by seeking  
 December } new channels has entirely forsaken its former  
 situation, the green matter which acquires some-  
 times a thickness of half an inch, is speedily  
 converted into a rich vegetable earth & becomes  
 the food of plants, the calcareous surface itself  
 decomposes and forms the richest black mold  
 intimately mixed with a considerable proportion  
 of silex (formed as I have supposed from the  
 coagulum) plants and trees of every kind now  
 vegetate luxuriantly upon this soil ; many how-  
 ever thrive upon the rock, where very little earth  
 is to be seen, particularly the cedar which seems  
 to grow from between the clefts of the hard rock.  
 The grape vine also seems to prosper in this un-  
 promising situation. I proceeded to examine the  
 piece of ground (above-mentioned) upon which  
 the snow would not lie: I found it covered in a  
 great measure with herbage, which was in part  
 turned brownish by the season, altho' there was  
 on a part of it a very small fine grass which was  
 green, a calcareous Crust appeared in some places  
 at the surface but in general there was a depth  
 of 5 or 6 inches & in some places a foot of the  
 richest black mold, the surface was manifestly  
 warm to the touch; the Therm<sup>o</sup> in the air was  
 then at 44° when placed 4 inches under the  
 surface & covered with earth, it rose rapidly to  
 68° and when placed at 8 inches or upon the  
 calcareous rock and covered up it rose to 80°  
 this

this result was very uniform over the whole surface which was about a quarter of an acre : { 1804 December in searching we found a spring about 15 inches under the surface which raised the Therm<sup>o</sup> to 130° Under the black mold was found a brown mixture of lime and silex very loose and divisible, which appeared to be advancing in its progress of decomposition towards the formation of black mold, under the brownish mass it gradually became whiter and harder and at the depth of six to 12 inches was nearly hard calcareous stone sparkling with silex : it was evident from every thing we saw around that the water had passed over this place & formed a flat superficies of siliceous limestone, and that its position nearly level had facilitated the accumulation of earth in proportion as the decomposition advanced: Similar spots of earth were found higher up. The hill resembling little Savannahs near which were always found hot springs, which had once flowed over the Savannahs ; it seems probable that the hot water of the springs, at an early period had all issued from its grand reservoir in the hill at a much higher elevation than at present, the Calcareous crust may be traced up in most situations on the west side of the hill looking down upon the Creek & valley to a certain height, perhaps 100 feet perpend: from that division the hill above rises precipitously & is studded all over with hard siliceous stones ; below

1804 } below the descent is more gradual, the soil cal-  
 December } careous black earth, the rock itself very often at  
 the surface, & frequently there is a precipice  
 on the margin of the Creek or a very precipi-  
 tous descent along the calcarious new formed  
 rock. The Therm<sup>o</sup> at 3<sup>h</sup> p.m. was at 44° and at  
 8<sup>h</sup> p.m. 38° Doctor Hunter continues indis-  
 posed.

Monday 24<sup>th</sup> Therm<sup>o</sup> before Sun rise 32° Wind moderate  
 from N.W. Some prospect this morning of a  
 favorable change, the moon is visible, and the  
 Sun yet behind the hill, announces his approach  
 with a bright blase: prepare for observation  
 — took the suns triple contact, hoping to ob-  
 tain correspondent observations in the afternoon  
 to regulate the watch. The moon was already  
 eclipsed by the Pine tree tops on the western  
 hill before the sun was risen high enough in  
 the East to enable us to take their distance; We  
 were therefore obliged to wait with patience  
 and ordered all the intervening trees to be cut  
 down to facilitate future observation: at noon  
 obtained a good altitude of the Sun but soon  
 afterwards it became cloudy, so that we got no  
 corresponding altitudes for the regulation of the  
 watch.

The Doctor found himself a little better, we  
 agreed to walk up the hot spring hill to make  
 new observations on this natural curiosity: we  
 now

now found it easy to trace out the separation between the primitive hill & that which has been accumulated upon its west side by precipitation from y<sup>e</sup> waters of the hot Springs ; this last is entirely confined to the west side of the hill washed at its base by the waters of the Creek, no hot spring being visible in any other part of its circumference ; by actual measurement along the base of the hill, the influence of the Springs is found to extend 70 perches in a direction a little to the eastward of North ; along the whole of this space the Springs have deposited stoney matter, which is probably principally Calcareous, but there is also evidence of Silex and Iron. All the Springs deposit red calx of Iron in their passage to the Creek ; the existence of Silex does not appear to me to be so fully decided ; there is certainly sparkling chrystals mingled with the lime, particularly remarkable in the calcarious matter partially decomposed, but having observed by the aid of the microscope that the whole of the calcarious rock exhibits nothing but a mass of congregated sparry matter, it is not improbable that those shining chrystals may be chrystalised lime ; the Doctor is now employed upon an analysis which will, no doubt, decide the point ; from some specimens I shall carry home with me, I shall hope to investigate the matter more at leisure. The accumulation of calcarious matter is much more considerable at the north

1804      }      north end of the hill than towards the south;  
 December }      the first may be above one hundred feet perpendicular, but sloping much more gradually than the primitive hill above, until it approaches the creek, where not unfrequently it terminates in a precipice of from 6 to 20 feet: the difference between the appearance of the primitive and secondary hill is so striking, that the most superficial observer cannot avoid taking notice of it: the first is regularly very steep studded with rock and stone of the hardest flint and other siliceous compounds all extremely hard, a superficies of two or 3 inches of good mold covers a body of red clay above described: below on the secondary hill, which carries evident marks of recent formation, no flint or siliceous stone is to be seen; the Calcareous rock has concealed all from view, & is itself frequently covered by much fine rich black earth; it would seem that this compound which is precipitated by the hot waters, encloses in its own bosom the seeds of its destruction, for it is remarkable that when the waters have ceased to flow over any portion of the rock, a superficial decomposition will there speedily take place; tho' I am inclined to suspect that heat communicated from the interior of the hill below contributes much to this operation of nature, because it is observable, that insulated masses of the rock remain without change.

The

The Cedar, the Wax-Myrtle and the Cassina  
Yapon, all beautiful evergreens attach themselves { 1804  
particularly to the calcareous region, & seem to  
grow and thrive in the clefts of the solid rock :  
at small intervals along the line of separation  
between the primitive and secondary hill, we  
discover many sources of hot water ; some flow-  
ing with some degree of freedom, & others in  
a manner stagnated and shut in by the accumula-  
tions of Stoney Concretion extracted by their  
own operation from the bowels of the hill. Any  
spring enjoying a freedom of position proceeds  
with great regularity in depositing its solid con-  
tents ; the border or rim of its basin forms an  
elevated ridge, from whence proceeds a glacis  
all around ; when the waters have flowed for  
some time over one part of the brim, this be-  
comes more elevated & the water can no longer  
escape on that side, but is compelled to seek a  
passage where the resistance is least, thus it pro-  
ceeds with the greatest regularity forming in  
miniature a Crater resembling in shape the con-  
ical summit of a volcano ; the hill being steep  
above, the progress of petrifaction is stopped on  
that side, & the waters continue to flow and  
spread abroad, encrusting the whole face of the  
hill below. I am persuaded that the accumula-  
tions and extent of the calcareous matter would  
have been vastly greater, perhaps the whole val-  
ley might have been filled up with it, did not  
the

1804 } the continual running of the creek water put  
 December } a stop to its progression on that side: the last  
 formed calcareous border of the circular bason,  
 (covered by the green feculum) is soft and easily  
 divided, a little under it is more compact, and  
 at the depth of six inches, it is generally hard  
 white stone; if the bottom of the bason is stirred  
 up, a quantity of red calx of iron arises and es-  
 capes over the summit of the crater.

It is surprising to see plants, shrubs and trees  
 with their roots absolutely in the hot water;  
 this circumstance being observed by some of the  
 visitants of the hot springs has induced some of  
 them to try experiments by sticking branches of  
 trees into the run of hot water; we found some  
 branches of the wax-Myrtle thrust into the bot-  
 tom of a spring-run, the water being at tem-  
 perature  $130^{\circ}$  of Farheneit's thermometer, the  
 foliage & fruit of the branch were not only sound  
 and healthy, but at the very surface of the water  
 fresh roots were actually sprouting from the  
 branch; the whole being pulled up for exami-  
 nation, it was found that the part which had  
 penetrated into the hot mud was decayed: this  
 phenomenon is so new & singular, that few per-  
 sons will at first be disposed to believe, judging  
 that deception or want of accuracy has led us  
 into error; it is however in the power of every  
 curious person who will give himself the neces-  
 sary trouble to try the experiments himself; in  
 the

the meantime Doctor Hunter and his son are evidences of the truth of the above statement. { 1804 December

— A luxuriant vegetation clothes the decomposed surface of the calcareous region, the black rich mold being of a good depth in some few places (6 or more inches) & in others shallower, and the rock in other situations is nearly unchanged, giving nourishment however to a mass of very short moss, which is gradually forming a soil different in appearance from that which is generated from the decomposed lime. The primitive part of the hill is greatly inferior in fertility to the secondary or recent portion, but it is far from being sterile: grape vines abound in both, particularly in the calcareous soil.

It may be proper to pause for a moment and enquire what may be the cause of the perpetual fire which keeps up without change the high temperature of so many springs flowing from this hill at considerable distances from each other. Upon looking around us, no data present themselves sufficient for the solution of the problem; nothing of a volcanic nature is to be seen in this country, neither have we been able to learn that in any part of the hills or mountains connected with this river, there is any evidence in favor of such a supposition. An immense bed of blackish blue schistus appears to form the basis of the hot-spring hill and of all those in its neighbourhood. The bottom or bed of the creek

1804 } creek is composed of scarcely any thing else ; I  
 December } have frequently taken up pieces of this stone,  
 rendered soft by decomposition and possessing  
 a very strong aluminous taste ; it seemed to re-  
 quire nothing but lixiviation and chrystalisation  
 to complete the manufacture of alum. As all  
 bodies which suffer chemical changes, generally  
 produce an alteration of temperature, it may be  
 enquired whether the decomposing schistus is  
 capable of generating a degree of Caloric corre-  
 sponding to the temperature of the hot springs.  
 Another cause we shall notice which perhaps  
 will be thought more satisfactory : it is well  
 known that in several positions within the Circle  
 of the waters of this river, vast beds of martial  
 pyrites exist ; they have not yet been discovered  
 in the vicinage of the hot springs, but it is ex-  
 tremely probable that they may be accumulated  
 in immense strata under the bases of those hills,  
 and as we have noticed at one place at least  
 some evidence of the existence of bitumen,\* we  
 cannot doubt that due proportions of those prin-  
 ciples united, will in the progress of decompo-  
 sition by the admission of air & moisture pro-  
 duce the degrees of heat necessary to support  
 the phenomina of the hot springs. No sulphuric

\* Having thrust a stick down into the crater of one of the hot springs some distance up the hill, several drops of petroleum or naphtha rose and spread upon the surface, it ceased to rise after three or four attempts.

acid

acid is present in this water ; the springs may be supplied by the vapor of heated water ascending from the Caverns where the heat is generated ; or the heat may be immediately applied to the bottom of an immense natural Caldron of rock contained in the bowels of the hill, from which as a reservoir the Springs may be supplied. Therm: at 8<sup>h</sup> p.m. 34° Extremes 32° -45°

Therm: 34° Wind N.W. Cloudy — The state Tuesday 25<sup>th</sup> of the heavens did not admit of any astronomical observations in the morning ; it cleared away before noon, so that we had a good meridian altitude of the Sun, which was scarcely over when the clouds overspread again the face of heaven, & it rained a part of the afternoon : the present being Christmas Day, we indulged the men with a holy-day, for which object they had hoarded up their rations of whisky, to be expended in merriment on this occasion, which terminated with inebriety but no ill consequence ensued. We amused ourselves with farther experiments on the hot waters ; the conduct of the analysis being left to Doctor Hunter as a professed Chemist, the results will be hereafter given. Thermom: at 8<sup>h</sup> p.m. 44° Extremes 34° -51°

Therm 34°. Wind N.W. clear. prepare for Wednesday 26<sup>th</sup> observation

1804 } observation. Took the Sun's contacts in the  
 December } morning hoping to get equal altitudes in the  
 afternoon; but as this is not always certain, I  
 make it a rule to note down the Sun's altitude,  
 so that the apparent time may be calculated;  
 and if the corresponding altitudes are taken  
 after noon; the calculation of the correction  
 for change of declination during the interval is  
 greatly facilitated by noting the altitudes. Before  
 instruments were brought to their present state  
 of perfection, the method hitherto in use was  
 to be preferred; but no reason can be assigned  
 why we should not now adopt a mode equally  
 correct, which saves half the labor, and more  
 especially that by using the altitudes, we do not  
 require that the Latitude should be previously  
 known.

This afternoon took the Altitude of the hill  
 west of the camp by measurement of a base  
 and two correct angles of elevation with the  
 circle of reflection, and found it to be 300 feet,  
 which is less than we had supposed: very steep  
 hills are extremely imposing; the ascent of the  
 hill was not much more than double its perpen-  
 dicular height, i. e. about 700 feet of inclined  
 plane and the angle at its base made by the  
 summit with the horizon above  $26^{\circ}$ . We had  
 no favorable position to ascertain by the same  
 means the height of the hill of the hot springs,  
 but having been on the tops of both distinctly

seen

seen from each other, we judge them to be of  $\left\{ \begin{array}{l} 1804 \\ \text{December} \end{array} \right.$  equal elevation.

In the morning between 10 and 11<sup>h</sup> made a set of Lunar observations, by taking twelve distances of the sun and moon's limbs: the moon being advanced within less than 60° of the sun, appeared with a very faint light in presence of the sun's image altho' darkened considerably, and it required very particular attention to obtain fine contacts, which are supposed to be very correct, altho' the eye remained greatly fatigued. — The afternoon being cloudy prevented taking the correspondent equal altitudes for the regulation of the watch. Therm: at 8<sup>h</sup> p.m. 44° Extremes 34°—50°

This morning being fine Doctor Hunter prepared to make his long meditated excursion of 3 or 4 days into the mountains, which the unfavorable state of the weather has hitherto prevented: the therm: stood at 26° before sun rise, and the face of the hill and creek were shrouded in condensed vapor. After breakfast the Doctor set out with our Pilot and three of the people; the rest were dispatched with loads of baggage to the river. Took a set of observations for equal altitudes, but we were again disappointed in obtaining the correspondent afternoon observations by the intervention of clouds; the mornings' altitudes of yesterday and this day will nevertheless be

1804 } be sufficient for the regulation of time by the  
 December } watch and obtaining her rate of going. At noon  
 had a very fine altitude of the Sun, which is  
 the seventh observation for the Latitude of this  
 place, and concludes our astronomical observa-  
 tions here, from whence will be deduced (it is  
 hoped) with sufficient precision the Latitude  
 and Longitude of this point of Louisiana, ren-  
 dered remarkable by the presence of so great a  
 natural curiosity as the Hot-springs. The mean  
 of the seven observations whose respective re-  
 sults were all very near to each other makes the  
 Latitude of the Hot-spring N° 3 to be  $34^{\circ} 30' 59''$ .82. This may be farther corrected by in-  
 troducing the deviation in north polar distance,  
 occasioned by the nutation of the Earth's axis ;  
 this being common to the Sun and to all the  
 Stars ought not to be neglected when great pre-  
 cision is required. The series of observations  
 above mentioned being reduced to the 21<sup>st</sup> De-  
 cember as the mean or middle time of the  
 series ; it will be found that the Sun's Right  
 ascension was then 9 signs and the place of  
 the moon's ascending node 9 signs 27 degrees ;  
 from whence results a correction in the Sun's  
 declination of  $-4''.34$  which quantity being ad-  
 ditive to the Latitude deduced, gives for the  
 true Latitude  $34^{\circ} 31' 4''$ .16. The Longitude  
 will be calculated at leisure & will be hereafter  
 noticed.

After

After the Doctor set out I amused myself { 1804  
 with pursuing experiments on the analysis of { December  
 the hot waters &c — Thermometer at 8<sup>h</sup> p.m.  
 38° Extremes 26°—45°

Therm: 34° Wind S.W. — Cloudy — ap- Friday 28<sup>th</sup>  
 appearance of rain or snow — Dispatched six of  
 our people with loads to the river Camp: after  
 breakfast set out upon a geographical tour round  
 the Hill of the hot-springs; young M: Hunter  
 with one of the people and my negro servant  
 attended: in the course of this survey there was  
 no indication of any hot spring but those of  
 which we have already spoken, all lying on the  
 same side of the hill within a space of 70 perches  
 as has been already noted: Every new inspec-  
 tion of those Curious springs brings forth some  
 addition to the limited knowledge we have ac-  
 quired of them; we find it now pretty evident  
 that most of the springs if not all have flowed  
 from a more elevated part of the hill than at pre-  
 sent; and the perpetual accumulations of Calca-  
 reous matter confining the sources have probably  
 elevated them to nearly the level of the grand  
 reservoir within the bowels of the hill; during  
 this process the calcareous rock has been formed  
 which we now see attached to the side of the  
 hill; at length however the issues of the waters  
 have become so obstructed and probably the level  
 of the water in the grand reservoir so elevated,  
 that

1804 } December } that by the superincumbent pressure of the waters, new passages have been forced in lower situations: it is evident that the springs which now break forth along the margin of the Creek, cannot be supposed to have flowed for a long time (comparatively) in their present situation; the formation of calcareous rock created by the springs in their actual position, resembling only small excrescences growing from the base of considerable precipices, is a proof of what we have advanced: some of those new springs have formed small flats of 20 to 30 feet extent; in general they have formed little elevations of 5 to 6 feet perpendicular, with a glacis of 10 or 15 feet terminated by a precipitate fall into the creek. Those small accumulations when compared with the great mass of rock spreading along the face of the hill to the perpendicular height of one hundred feet, are certainly a demonstrative proof of the recent existence of the inferior springs: an ingenious observer of Nature, by some years attention might determine the quantity of calcareous matter precipitated in a given time from some one spring, which would furnish us with a datum, from whence to form a proximate calculation of the antiquity of the Springs. We have already noticed that some springs still exist even at the very limit which separates the calcareous region from the primitive hill; their temperature is similar to those

those below, they are all feeble and are soon lost  
upon the face of the hill, & perhaps contribute  
to augment the inferior springs.

We found the circuit of this hill to be about  $3\frac{1}{5}$  miles, measuring round its base as correctly as the uneven surface would permit: altho' this hill when seen from the hill to the west of the valley appears to represent a handsome conical monticule in an insulated situation, yet our geographical survey discovered to us that it is connected in the rear by a very narrow ridge, with a chain of inferior hills dividing the Creek of the hot-springs from a branch of the Calfat. We find invariably the upper half of the hills to be filled up with the hardest flinty rocks, with an admixture of the hardest freestone; much of both particularly the first have rolled down & are found all the way to the base: At the foot of those hills & at some elevation are found immense strata of schistus, some of a yellowish color, which forms by decomposition an earth of the same color, presenting at first view the appearance of clay, but it is greatly deficient in tenacity: The base of the hills and the vallies contiguous to the hot-spring hill seem chiefly occupied by a bluish black Schistus, altho' there be veins of the siliceous genus crossing this last in several places: there is no doubt that a manufacture of Alumn might be established here upon an immense scale; the schistus under foot is frequently

1804 } frequently found in a state ready to yield alum, .  
 December } as appears from the astringent and sweet taste it  
 possesses.

After our return to Camp, I determined to have another microscopic examination of the green matter and hot water before leaving finally this place. I procured some of the green matter of a very beautiful kind, resembling a moss whose fibres were more than half an inch in length; a film of the same green matter was spread upon a calcareous base, & from the film sprung the fibres representing a beautiful vegetation completely immersed in water of  $130^{\circ}$  temperature; This moss (if it shall be found to be vegetable) was brought to this state of perfection by growing in a small natural basin containing some depth of water in a state of comparative repose, communicating freely with one of the springs, but no current passed thro' it.

This moss sparkled before the microscope with innumerable nodules of lime, some part of which seemed to be beautifully chrystalized, and altho' the fine green color of the moss was visible thro' the lime, yet it was thereby so much concealed, that it was impossible to decide whether it possessed the true organic structure of a vegetable; I incline however now to believe that the green matter is a true vegetable, not only from its great resemblance to some of the mosses particularly the Byssi, but also from the discovery

discovery I have just made that this moss is the 1804  
December residence of animal life: after frequent search I at length discovered a very minute shell-fish of the bi-valve kind inhabiting this moss; its shape is nearly that of the fresh water muscle; the color of the shell is greyish brown with certain spots of a slight purplish appearance; when the animal is undisturbed it opens its shell & thrusts out four legs very transparent, and articulated like those of a quadruped; the extremities of the forelegs are very slender & sharp, but those of the hind legs somewhat broader as if armed with minute toes; from the extremity of each shell, issues 3 or 4 forked hairs, which the animal seems to have the power of moving; the forelegs seem formed for making incisions into the moss for the purpose of procuring access to the juices of the living plant, upon which no doubt it feeds, and I think it highly probable that the animal is provided with a proboscis, tho' I was unable to discover it; the hind legs seem well adapted for propelling the animal in its progress over the moss or thro' the water.

A considerable quantity of snow fell while we were engaged on the survey and after our return. Thermometer at 8<sup>h</sup> p.m. 30°. Extremes 30°-34°. — at 3<sup>h</sup> p.m. 32°.

Therm: 25° Wind at N.W. strong all night, Saturday 29<sup>th</sup> some flying clouds appear in the morning.— Got the

1804 } the people ready with their loads between 9 &  
 December } 10<sup>h</sup> a.m. and I set out with them myself for the  
 river camp ; it began to snow at 10 o'clock, but  
 did not continue ; the weather continued cloudy,  
 but the exercize of walking rendered the tem-  
 perature (tho' cold) very agreeable ; the low  
 grounds thro' which we passed were a little  
 watery, in consequence of the rains which had  
 fallen, but not more so, than when we first  
 walked out to the hot springs ; the soil of the  
 flat lands under the stratum of vegetable mould  
 was chiefly yellowish and was evidently decom-  
 posed schistus, of which there were immense  
 beds in every stage of its progress from the hard  
 stone recently uncovered, partially decomposed  
 and down to the yellowish earth apparently ho-  
 mogenious. The covering of vegetable mould  
 between the hills and the river is in most places  
 sufficiently thick to constitute a good soil, being  
 from 4 to 6 inches, and it is the opinion of the  
 people upon the Washita that wheat would grow  
 here to great perfection. Altho' the higher hills  
 (300 to 600 feet) are very rocky, yet the inferior  
 hills and sloping bases of the first are generally  
 clothed with a soil of a middling quality, the  
 natural productions are sufficiently luxuriant,  
 consisting chiefly of black and red oak inter-  
 mixed with a variety of other woods and a con-  
 siderable undergrowth ; and even on those rocky  
 hills, Nature has bestowed a soil which will  
 reward

reward the future labors of the industrious Vignerons: Nature herself unaided by man has already planted on them three or four species of Vines, which are said to produce annually an exuberance of excellent grapes. A great variety of plants, some of which in their season, I am informed produce flowers highly ornamental, would probably reward the researches of the Botanist.

On the way into the river I took the courses by compass and the distances by time; when the Doctor comes with the last party I have appointed two good hands to chain the same distances, to be noted down by young M<sup>r</sup> Hunter — At 8<sup>h</sup> p.m. the therm<sup>o</sup> was down at 24° — the wind blew strong all the afternoon, but fell calm by night.

I omitted to observe in its proper place that having observed from the bottom of one of the hot springs a frequent ebullition of gas, we should have collected some for examination, but no apparatus was provided for the purpose, it was so unfortunate that we had not even a funnel at the Springs, which with a bottle might have sufficed: it was not hydrogen, because I failed in several attempts to inflame it by a lighted torch: there can be no doubt of its being Carbonic acid, having always found indications of an excess of a weak acid, by which the lime and iron were dissolved in the water. With respect to the quantity

1804 }  
 December }  
 tity of hot water delivered by the springs I made  
 the following rough estimate.— There are four  
 principal springs, two of inferior note, one ris-  
 ing out of the gravel and a number of drippings  
 and drainings all issuing from the margin or  
 from under the rock which overhangs the creek.  
 Of the four first mentioned, three deliver nearly  
 equal quantities, but one (Nº 1) the most con-  
 siderable of all and the hottest delivers about  
 five times as much as one of the other three,  
 the 2 of inferior note may be equal to one, and  
 all the drippings & small springs are probably  
 underrated at double the quantity of one of the  
 three; that is, taking all together, the whole will  
 amount to a quantity equal to eleven times the  
 water delivered by the standard spring, which  
 was the only one commodiously situated for mea-  
 surement ; I neglect the springs up the hill, be-  
 cause it is probable that what is not evaporated  
 unites with the springs below. We found a Kettle  
 containing eleven quarts was filled by the stand-  
 ard Spring in eleven seconds; Hence the whole  
 quantity of hot water delivered by all the springs  
 issuing visibly from the base of the hill may  
 amount in one minute to 165 gallons and in 24  
 hours to  $377\frac{1}{2}$  Hhds of 63 gallons each, which  
 is equal to a handsome brook and might work  
 an over-shot mill. In cool weather condensed  
 vapor is seen arising out of the gravel bed of the  
 Creek from springs which cannot be taken into  
 the

the account; during summer and fall I am in- { 1804  
 formed the Creek receives little or no water, but { December  
 what is supplied by the hot-springs, at those sea-  
 sons probably many small springs may be seen  
 rising out of the bed of the Creek, which are  
 now invisible; during that time the Creek itself  
 is a hot bath, too hot indeed near the springs,  
 so that a person may chuse the temperature most  
 agreeable to himself, by selecting a natural basin  
 nearer to or farther from the principal springs;  
 at 3 or 4 miles below the springs, the water is  
 tepid and unpleasant to drink.

Therm: in air 9° in river water 36° — wind Sunday 30<sup>th</sup>  
 very light at N.W. This morning & the night  
 past are the coldest we have experienced this  
 winter. The People set off very early to bring  
 in Doctor Hunter's baggage from the springs.  
 Employed myself in bringing up my journals  
 &c — The Doctor arrived with the people about  
 3<sup>h</sup> p.m. — The Sky was most serenely clear this  
 day, its color over head was that of the darkest  
 prussian blue and during last night the stars  
 shone with uncommon lusture. People have  
 conceived an idea that they see more stars here  
 and at the hot springs than any where else;  
 which idea arises from the extreme transpar-  
 ency of the atmosphere, which causes the stars  
 to strike the eye with greater brightness, and no  
 doubt stars of inferior magnitude will be seen in a  
 pure

1804 } pure sky which are invisible in an ordinary one.  
 December } This evening some light clouds appeared about the sun-setting, which is an indication of change of weather; we now anxiously expect rain, as we wait only for the first rise of the river to go down with safety over the falls and rapids; 5 or 6 feet perpendicular will be sufficient. At night the atmosphere became again extremely bright — at 8<sup>h</sup> p.m. the therm<sup>er</sup> was at 21°. Extremes 9°-38° — It became very cold at 10<sup>h</sup> p.m.

Monday 31<sup>st</sup> Therm<sup>er</sup> in air 29° in river water 36° — Wind S.E. During the night the Weather altered greatly; the temperature was much molified and the stars disappeared; in the morning one general cloud enclosed the horizon, and from the damp penetrating chilliness of the morning we look for snow: ordered setting poles to be made & every thing to be prepared for the first favorable moment to depart. The day continued cloudy, & in the afternoon the therm<sup>er</sup> having risen to 32° it began to snow and continued all day and part of the night: Examined some of the green moss from the hot-springs, with a view to shew Doctor Hunter one of the Bivalved testaceous animals, found a large one which under the microscope measured  $\frac{1}{50}$  of an inch in length by the micrometer.

1805 }  
 January }  
 Tuesday 1<sup>st</sup> } This morning the thermometer was at 26° —  
 It

It had ceased snowing in the night but recommenced after day light ; the snow was sounded 1805  
January and found in most places to be from 11 to 13 inches ; we are in hopes that the melting of this snow united to the rain which will probably accompany the thaw, will be sufficient to take us down in safety ; being desirous however of ascertaining what aid we had to expect from the snow, I made the following experiment — I took a Cylindric Kettle 10 inches deep & having by sounding found a flat piece of snow of the same depth, I pressed down the Kettle bottom upwards perpendicularly to the ground ; I was thus enabled to return the Kettle completely filled with its column of snow, and having thawed it gradually to the temperature of 33° I found the water to measure exactly 1.07 inches, that is, 9.346 inches of snow will yield one inch of water in the circumstances above mentioned ; it is observable that the snow fell lightly without wind, it is therefore probable that the proportion of ten to one may be adopted as a general standard to be varied according to circumstances. The snow continued frozen all day, and the therm: at 3<sup>h</sup> p.m. did not fall below the freezing point and in the evening at 8<sup>h</sup> p.m. it was fallen to 18°.

Thermometer in air 6° in river water 32° Wednesday 2<sup>d</sup>  
Calm — The night proved extremely cold ;  
large

1805 } large fires with all the covering that could be  
 January } conveniently used were necessary to render our  
 situation comfortable in a bad tent negligently  
 chosen at New Orleans. The sun arose bright  
 and shone with splendor upon the surface of  
 the snow which covered every object upon the  
 ground; the river alone presented a bleak ap-  
 pearance with a condensed vapor floating upon  
 its surface; the temperature of the river was at  
 the freezing point; a kettle of water being  
 brought up to Camp and placed on the ground  
 four feet from a large fire, its surface began im-  
 mediately to shoot into icy chrystralizations.—  
 Our hunters are tolerably successful, bringing in  
 every day abundance of Venison and Turkies.—  
 The day became pleasant and agreeable, the  
 temperature at 3<sup>h</sup> p.m. being 45° and at 8<sup>h</sup> p.m.  
 the thermometer fell to 32°

Thursday 3<sup>d</sup> Thermometer in air 22° in river water 34°—  
 wind moderate at N.W. The atmosphere be-  
 came cloudy in the night and we looked confi-  
 dently for a change of weather, but this morning  
 it has become serene and fine; the vicissitudes  
 of the weather have of late been frequent, a  
 change is now extremely desireable but the sea-  
 son seems obstinately bent against all change.  
 The day became pleasant and of an agreeable  
 temperature, the thermometer at 3<sup>h</sup> p.m. being  
 at 48° and at 8<sup>h</sup> in the evening 30°

Thermometer

Thermometer in air 22° in river water 36° —  
 Calm — during the night it became cloudy, not 1805  
 January  
 Friday 4<sup>th</sup>  
 a star was to be seen but before morning it cleared away & became perfectly serene and cloudless. The day proved fine, the sky over head of a bright but deep prussian blue, the temperature mild, the thermometer at 3<sup>h</sup> p.m. being up to 50° In the afternoon the Doctor made an excursion upon the river to examine some of the neighbouring hills: I continued to bring up and arrange my Journals. The evening was fine, the thermometer at 8<sup>h</sup> p.m. was at 32° — no favorable appearance yet of rain to raise the river; the snow is disappearing without producing any beneficial effect: we continue here as prisoners, waiting for what is usually called bad weather, to bear us away from this place.

Thermometer in air 22° in river water 36° Saturday 5<sup>th</sup>  
 Wind N.W. The atmosphere became cloudy in the night, but was perfectly serene and clear at day-break, so that we have no near prospect of our departure. The day became fine and seemed to invite us to recommence astronomical observations, and altho' a sufficient series had been made both for Latitude and longitude at the hot-springs connected by survey with this place, yet we began a new series. Equal altitudes of the sun were taken before and after noon; three distances of the moon and sun's limbs were

1805 } were taken near 2<sup>h</sup> p.m. and in the evening  
 January } three distances of the moon's west limb from  
 Aldebaran were taken between 6 & 7<sup>h</sup> p.m. —  
 a greater number would have been taken, but  
 in the first case the Sun got behind some trees  
 and in the second case, the moon was in a simi-  
 lar situation, if tomorrow proves fine we shall  
 prosecute the same operations to more advan-  
 tage, having ordered several trees to be cut down  
 which stood in the way — Wind S.E.

The day continued fine and of a mild tem-  
 perature; some few clouds keep up our hopes  
 of a change — Thermometer at 8<sup>h</sup> p.m. 28° —  
 Extremes 22°—55°

Sunday 6<sup>th</sup> Thermometer before sun-rise in air 28° in river  
 water 38° This morning proved cloudy contrary  
 to expectation and revived our hopes of a change  
 of weather favorable to our descent: This state  
 of the atmosphere continued all day; from time  
 to time there was a little light rain or mist.  
 The rain increased a little after dark, but still  
 very light: the snow seems now melted away to  
 about one fifth or sixth of the original quantity;  
 we began to apprehend that the whole would  
 disappear without any influence upon the river,  
 but now it has risen about 12 inches: Thermom-  
 eter at 8<sup>h</sup> p.m. 44° Extremes 28°—50°

Monday 7<sup>th</sup> Thermometer in air 64° in river water 44°  
 Last

Last night it rained very lightly by intervals, so little indeed that a cylindric vessel placed to receive it, did not contain enough to be measured.

1805  
January

During the night the temperature was extremely warm, and the weather continues to be cloudy, but not very dark, so that our prospect of rain is not very flattering ; the river has nevertheless risen 18 inches since last night, which has no doubt been caused by the melting of the snows. The sun shews himself at intervals between the clouds: it became so warm that we dined abroad under the shade of lofty pine and oak trees, upon the wild game of the forest and the river, such as Venison, wild Turkey, bear, Cygnet &c: The thermometer at the hour of dinner was at 75° which at this season produces the sensation of a summer's sun of 90°; the river continues to rise, and we have taken the resolution to wait the issue of the present state of the weather and to set out at all events ; if there be not water enough to go over the falls with safety by the oar, we shall pass along by letting ourselves down by the help of a rope, step by step, until the danger is passed. Thermometer at 8<sup>h</sup> p.m. 38° Extremes 38°-78° In the evening the river continues to rise.

Thermometer in air 28° in river water 46° Tuesday 8<sup>th</sup>  
Last night was cloudy, moist and cold, the river  
rose considerably in the night; we suppose it to  
be

1805 } be about 6 feet perpendicular, higher than the  
 January } level of the river when we came up, we now  
 think ourselves secure of going down with speed  
 and safety; orders were therefore given to em-  
 bark our baggage and prepare for departing. We  
 had the satisfaction of taking with us an abun-  
 dance of fresh provision chiefly venison, to supply  
 us to the Post of the Washita. We accordingly  
 set off between 9 & 10 o'clock and landed a  
 little below upon the opposite shore and went  
 to examine the first rapids, which we found to  
 be very safe; we re-embarked, and by directing  
 our course between the breakers, passed along  
 with the rapidity of an arrow in perfect secu-  
 rity: we continued moving with great rapidity  
 on the face of the current, but thought it pru-  
 dent to land and view a second rapid, and after  
 exploring the best passage we passed down in  
 perfect safety.

We got over the great 'Chutes' about 1  
 o'clock, two of our oars having been violently  
 dashed overboard by the willows, the Pilot  
 thinking it safest to keep the eastern shore on  
 board; we halted below and regained our oars  
 by sending up the Canoe. There we dined and  
 went on & stopped a little below to examine  
 the flinty promontory already noticed on the 3<sup>d</sup>  
 December. We took some specimens of the rock  
 resembling the Turkey oil-stone: it appears to  
 me to be too hard; I remarked that the strata  
 of

of this chain ran perpendicularly nearly East and West, crossed by fissures at right angles 5, 6 to 8 feet apart; the laminæ were from  $\frac{1}{4}$  to 4 or 5 inches thick. About a league below on the same side, landed at Whetstone hill and took several specimens; this projecting hill consists of a mass of greyish blue schistus of considerable hardness and about 20 feet perpendicular; near the top, it was in a state of progression towards decomposition, being there extremely crumbly and part of it changing into a dirty yellowish color: the laminæ were in general perpendicular, but not regularly so, and from  $\frac{1}{4}$  to 2 inches in thickness, but did not split asunder with an even surface: went on and encamped about ten leagues below Ellis' Camp. Thermometer at 8<sup>h</sup> p.m. 37° Extremes 28°–37° It rained lightly after we encamped, which rendered the flat ground of our encampment very wet and the wood difficult to burn.

Thermometer in air 42°, in river water 44° Wednesday 9<sup>th</sup>  
 — The river fallen about six inches — During the night it rained by intervals, but very lightly, the air was moist and cold, the soil here immediately under the vegetable stratum is yellowish and of little consistency, resembling greatly the understratum observed near the hot springs, produced probably by the same cause, the decomposition of schistus. Last evening ordered provisions

1805 } provisions to be dressed for the day, to save the  
 January } time of landing during the day for that purpose;  
 about two miles below our Camp landed to examine some freestone and blue slate in sight of ' Bayou de la Prairie de Champignole ' mentioned the 2<sup>d</sup> Dec: The freestone of which we took specimens, seems proper for grindstones, scythe-stones &c; but the blue slate as it is called is only bluish schistus, hard & brittle; and not proper for the roofing of houses; we have not seen slate good for that purpose except some discovered on one of the Doctor's excursions on the Bayou Calfat. Much game on the river, such as Geese, ducks, swans &c; they continue equally wild and difficult of approach as before, so that we derive little benefit from that source.

The day continued dark, cloudy & cold with the wind at North; at 11<sup>h</sup> a.m. it began to snow and hail with rain by intervals: we observed nothing this day meriting remark, different from what we saw on our way up. Towards evening it began to clear away; and soon after we encamped the sky became serene. By the Pilot's estimation we made this day nineteen leagues, which probably do not exceed forty miles: we passed five of our night encampments on the way up. Encamped a league above ' Cache à Maçon ' —slept a little higher on the 27<sup>th</sup> Novem: Thermometer at 8<sup>h</sup> p.m. 24°, Extremes 24°—42° at 3<sup>h</sup>.

3<sup>h</sup> p.m. 36° The moon and stars shone with  
uncommon lusture. { 1805  
January

Thermometer in air 23°, in river water 42° — Thursday 10<sup>th</sup>  
river fallen 7 inches. The face of the heavens  
changed much in the night, it became extremely  
dark and cloudy, and this morning with the wind  
at north; it is cold, damp and penetrating; the  
river fallen seven inches during the night. After  
setting out, the clouds began to dissipate & the  
sun to shew himself, a very agreeable sight to  
travellers in cold & unpleasant weather; it con-  
tinued never-the-less cold all day, the sun not  
possessing power to soften the rigorous cold  
which prevailed, the thermometer not rising  
above the freezing point from morning until  
night. We made this day by the Pilots account  
fourteen leagues and encamped at 'auges d'Ar-  
clon' (Arclon's troughs) three leagues below the  
little misouri; slept near this place on the 23<sup>d</sup>  
november: it appears by reference to the Jour-  
nal, that we were thirteen days in going up from  
this place to Ellis' Camp, which has required  
but three broken days to come down, having  
made several stops to examine certain objects  
on our way down, and to day we made a more  
considerable delay at the Camp of a M. Le  
Fevre. This was an intelligent man, a native  
of the Illinois, now residing at the Arcansas;  
he is come here with some Delaware and other  
Indians

1805 } Indians whom he has fitted out with goods, and  
 January } receives peltry, fur &c at a stipulated price, as it  
 is brought in by the hunters. This gentleman  
 informs us that a considerable party of the Osages  
 from the Arcansa river have made an excursion  
 round by the prairies towards the red river, and  
 down the little missouri as low as the 'fourche  
 d'Antoine', and there meeting with a small party  
 of Cherokees, are supposed to have killed four  
 of their number & others are missing ; Three  
 Americans and ten Chicasaws went a hunting  
 into that quarter, who may also have been in  
 danger, those Ozages being no respecters of per-  
 sons. M. Le Fevre possesses considerable know-  
 ledge of the interior of the Country ; he con-  
 firms the accounts we have already obtained  
 that the hills or mountains which give birth to  
 the various sources of this little river are in a  
 manner insulated ; that is, they are entirely shut  
 in and enclosed by the immense planes or prai-  
 ries which extend beyond the red river to the  
 South & beyond the Missouri (or at least some  
 of its branches) to the north and range along  
 the eastern base of the great chain or dividing  
 ridge, commonly known by the name of the  
 sand hills, which separate the waters of the Mis-  
 sissippi from those which fall into the western  
 pacific ocean : The breadth of this great plane  
 is not well ascertained, it is said by some to be  
 at certain parts or in certain directions not less  
 than

than two hundred leagues, but I believe it is 1805  
January agreed by all that have a knowledge of the Western Country, that the mean breadth is at least two thirds of this quantity ; a branch of the Missouri called the river platte or shallow river is said to take its rise so far south, as to derive its first waters from the neighbourhood of the sources of the Red and Arcansa rivers. By the expression planes or prairies in this place is not to be understood a dead flat resembling certain savannahs, whose soil is stiff and impenetrable, often under water & bearing only a coarse grass resembling reeds; very far different are the western Prairies, which expression signifys only a country without timber: Those Prairies are neither flat nor hilly, but undulating into gently swelling lawns and expanding into spacious valleys in the center of which is always found a little timber growing upon the banks of brooks and rivulets of the finest water, the whole of those prairies is represented to be composed of the richest and most fertile soil ; the most luxuriant & succulent herbage covers the surface of the Earth interspersed with millions of flowers and flowering shrubs of the most ornamental and adorning kinds : Those who have viewed only a skirt of those prairies, speak of them with a degree of enthusiasm as if it was only there that Nature was to be found in a state truely perfect; they declare that the fertility and beauty of

1805 } of the rising grounds, the extreme richness of  
 January } the Vallies, the coolness and excellent quality  
 of the waters found in every valley, the Salu-  
 brity of the atmosphere and above all the gran-  
 deur and Majesty of the enchanting landscape  
 which this Country presents, inspires the Soul  
 with sensations not to be felt in any other region  
 of the Globe. This Paradise is now very thinly  
 inhabited by a few tribes of savages and by im-  
 mense herds of Wild Cattle (Bison) which peo-  
 ple those countries ; the Cattle perform regular  
 migrations according to the seasons, from south  
 to north, and from the planes to the mountains ;  
 and in due time taught by their instincts take  
 a retrograde direction : those tribes move in the  
 rear of y<sup>e</sup> Herds and pick up stragglers & such as  
 lag behind, which they kill with the bow and  
 arrow for their subsistence ; should it be found  
 that of this rich and desireable Country there is  
 500 miles square, and from report, there is prob-  
 ably much more, the whole of it being cultiva-  
 ble, it will admit of the fullest population, and  
 will at a future day vie with the best cultivated  
 & most populous countries on the Globe : in  
 this particular the province of Holland exceeds  
 perhaps all others ; there, one million of acres  
 support two millions of Inhabitants ; but as Mar-  
 itime Countries enjoy superior advantages re-  
 specting population, by the interchange of their  
 manufactures for the necessities of life, which

last

last in an inland country must be totally drawn { 1805  
from the product of the proper soil, we shall { January  
suppose this new Country to be populated in the  
proportion of one tenth only of that of Holland,  
in which case it will be capable of subsisting  
a nation composed of twenty six millions of  
Souls. This Country is not exposed to be rav-  
aged by those sudden and impetuous deluges of  
rain which in most hot countries and even in  
the Mississippi Territory, do sometimes tear up  
& sweep away with irresistible fury the crop  
and the soil together; on the contrary, rain is  
said to become more rare in proportion as the  
great chain of mountains is approached, and it  
would seem that within the sphere of attraction  
of those elevated chains little or no rain falls  
upon the adjoining planes; this relation is the  
more credible, as in that respect our new Coun-  
try may resemble other flat or comparatively low  
countries similarly situated, such as the Country  
lying between the Andes and the Western paci-  
fic: the planes are supplied with nightly dews  
so extremely abundant as to have the effect of  
refreshing showers of rain, and the spacious  
vallies which are extremely level may with fa-  
cility be watered by the rills & brooks which  
are never absent from those situations: such is  
the description of the better known country ly-  
ing to the south of the red river, from Nacok-  
doches towards St Antonio in the province of

Texas:

1805 } Texas: \* the richest crops are said to be pro-  
 January } duced there without rain, but agriculture in that  
 quarter is at low ebb; the small quantities of  
 maize furnished by the Country, is said to be  
 produced without cultivation, a rude opening is  
 made in the earth just sufficient to deposit the  
 grain at the distance of four or five feet in  
 irregular squares, and the rest is left to nature;  
 the soil is naturally tender, spongy and rich, &  
 seems always to retain humidity sufficient with  
 the bounteous dews of heaven to bring the crops  
 to maturity.

The red and Arcansa rivers whose Courses are  
 very long pass thro' portions of this fine Coun-  
 try, they are both navigable to an unknown dis-  
 tance by boats of proper construction; the Ar-  
 cansa river is however understood to have greatly  
 the advantage over its neighbour with respect  
 to the facility of Navigation: some difficult  
 places are met with in the red river below the  
 Nakitosh, after which it is good for 150 leagues  
 (probably the computed leagues of the Coun-  
 try of nearly 2 miles each) there the Voyager  
 meets with a very serious obstacle. viz the com-  
 mencement of the Raft as it is called, that is,  
 a natural covering which conceals the whole  
 river for an extent of 17 leagues continually aug-  
 menting by the drift wood brought down by

\* The x is pronounced gutturally, precisely in the same  
 tone as the Scotch pronounce the gh in night, light &c  
 every

every considerable fresh; this covering which { 1805  
for a time was only drift wood, supports at this { January  
time a vegetation of every thing abounding in  
the neighbouring forest, not excepting trees of  
considerable size, & the river may be frequently  
passed without any knowledge of its existence;  
it is said that the annual inundation is opening  
for itself a new passage thro' the low grounds  
near the hills, but it must be a long time be-  
fore Nature unaided will dig out a passage suffi-  
cient for the reception of the waters of the red  
river; about 50 leagues above the natural bridge  
is the residence of the Cadeaux or Cadadoquis  
Nation, of whose good qualities we have already  
spoken; the Inhabitants estimate the Post of  
Nakitosh to be half way between New Orleans  
and the Cadeaux Nation: above this point the  
red river is said to be embarrassed by many  
rapids falls and shallows, none of which are  
said to be met with in the Arcansa river as high  
as it is known, except in the very lowest state  
of its waters; the navigation is reported to be  
safe and agreeable, the lands on either side are  
of the best quality & well watered with springs,  
brooks & rivulets, & many situations proper  
for mill-seats; from the description it would  
seem, there is along this river a regular grada-  
tion of hill and Dale presenting their extrem-  
ities to the river; the hills are gently swelling  
eminencies and the Dales are spacious Vales with  
living

1805 } living water meandering thro' them: the forests  
 January } consist of handsome lofty trees, & chiefly what  
 is called open woods, without cane-brake or  
 much underwood; the quality of its lands is sup-  
 posed much superior to that of the red river,  
 until it ascends to the Prairie Country, where  
 the lands are probably very similar. About 200  
 leagues up the arcansa, is an interesting place  
 called the salt Prairie, there is a considerable  
 fork of the river there, and a kind of Savannah  
 where the salt water is continually oozing out &  
 spreading over the surface of a plane; during the  
 hot dry Summer Season, the salt may be raked  
 up into large heaps; a natural crust of a hand-  
 breadth in thickness is formed when the dry  
 season prevails; this place is not often approached  
 on account of the danger from the Ozage In-  
 dians; much less do the White hunters venture  
 to ascend higher where it is generally believed  
 that silver is to be found. We have been also  
 informed that high up the arcansa river, salt is  
 to be found in form of a Solid rock, & may  
 be dug out with the Crow-bar. The waters of  
 the Arcansa like those of the red river, are not  
 potable during their low state; they are both  
 charged highly with a reddish earth or marl  
 and are also extremely brackish; this inconven-  
 ience is not greatly felt upon the Arcansa, where  
 springs, rills & brooks of the finest fresh water  
 are so frequent; the red river I believe is not

so

so favorably situated. Every account seems to demonstrate that immense natural magazines of salt must exist in the great chain of mountains to the westward, all rivers flowing from those mountains during the dry season retain a strong impregnation of salt, until that property becomes imperceptible by the accession of the fresh waters of many other rivers. — The great western prairies, besides the herds of wild Cattle (Bison commonly called Buffalo), are also stocked with vast numbers of a species of wild goat, (not resembling the domestic goat) extremely swift of foot; as the description given of this goat has not been very perfect, I have supposed from its swiftness, it might be the antelope; or it may possibly be a goat which has escaped from the spanish settlements of new Mexico: I have conversed with a Canadian who has been much with the Indians to the westward, this man told me that he had seen great flocks of an wool-bearing animal larger than common sheep; the Wool is much mixed with hair. This is probably the same animal which has been described & of which a plate has been given in the medical repository of New York. The Canadian pretends also to have seen an unicorn; the single horn he says rises out of the forehead & curls back, according to his description so as to convey the idea of the fossil *Cornu Ammonis*; this man says he has travelled beyond the great dividing ridge

1805 } ridge so far as to have seen a large river flowing  
 January } ing to the westward; the great dividing mountain is so lofty that it requires two days to ascend from its base to its top, other ranges of inferior mountains lie before and behind it; they are all very rocky & sandy, large lakes and vallies lie between the mountains; some of the lakes are so large as to contain considerable islands, and rivers flow from some of them: great numbers of fossil bones of very large dimentions are seen among the mountains, which the Canadian supposed to be of the Elephant; he does not pretend to have seen any of the precious metals, but has seen a mineral which he supposed might yield Copper: from the top of the high mountain, the view is bounded by a curve as upon the ocean and extends over the most beautiful prairies which seem to be unbounded particularly to the East; the finest of the lands he has seen are on the Misouri, no other can compare in point of richness and fertility with those of that river.

This Canadian as well as M. Le Fevre say that the Osages of the tribe of white hairs in the month of December (early in the month), plundered all the white hunters and traders upon the arcansa river. All the old french hunters agree in accusing the Osages of being extremely faithless, particularly those on the arcansa, the others they say are but very little more to be depended upon;

upon ; they pretend to make peace & enter into { 1805  
terms of amity, but on the first favorable occa- { January  
sion, they rob, plunder and even kill without  
hesitation, The other indian tribes speak of them  
with great abhorrence, and say they are a bar-  
barous uncivilized race. The different nations  
who hunt in their neighbourhood, have been  
concerting plans for their destruction.

M. Le Fevre informs me that the Nation  
of the arcansas always waging a defensive war  
with the Osages, propose sending in the spring  
of the year a deputation of three Chiefs to the  
Government of the United States. They say  
that the Country from the Washita river on the  
south to the river S<sup>t</sup> Francis on the north is their  
property, that they propose to say to the Gov-  
ernment of the U. S. "We will relinquish to  
"your people all our lands to the North of the  
"arcansa river, on the white river and on the  
"river S<sup>t</sup> Francis ; we will also relinquish our  
"lands upon the mississippi lying between the  
"rivers arcansa and Washita to an extent west-  
"erly far beyond any settlements which have  
"been attempted by the white people, the lim-  
"its of which we will ascertain ; but we request  
"that the powerful arm of the U. S. will de-  
"fend us their children in the possession of the  
"remainder of our hunting grounds, lying be-  
"tween the Arcansa and Washita rivers." —  
Thermometer at 8<sup>h</sup> p.m. 19°, Extremes 19°—  
32°

1805 } 32° The Moon & Stars shine with uncommon  
January } splendor.

Friday 11<sup>th</sup> Thermometer in air 11°, in river water 39°  
River fallen 4½ inches. Wind moderate at North.  
The morning is fine, the sky perfectly serene,  
but the air very cold and penetrating: passed  
the petit ecor à Fabri, the osier which grows  
abundantly upon the beaches above is not seen  
any lower upon this river, and at this place we  
begin to see the small tree called 'Charnier'  
which grows only at the water side, and is to be  
seen all the way down the Washita below this  
place, the Latitude here is about 33° 40' which  
is the limit Nature seems to have placed to those  
two vegetables, one on the north & the other to  
the south.

I have already remarked in my Journal of  
the 17<sup>th</sup> November that we saw no long moss  
(Tilandsia) above Latitude 33° & conjectured  
that Nature had limited its vegetation to that  
parallel; having this circumstance in my recol-  
lection, I asked M. Le fevre for information re-  
specting its existence at the Arcansa settlement,  
which is known to be not far beyond 33° of  
Latitude; he informed me that about ten miles  
to the south of their settlement the growth of  
the Tilandsia is limited, & that so curiously as  
if a line had been drawn East and West for the  
purpose, as it ceases all at once & not by degrees;  
hence

hence it would appear that Nature herself has marked with a distinguishing feature the line which Congress has thought proper to draw between the territories of Orleans and of Louisiana. It is a question of curiosity at what Latitude the limit of the Tilansia is found in the atlantic states, and also the Cypress, which last upon this small river is not found higher than  $34^{\circ}$  of latitude, it is believed to be much higher on the Mississippi: our maps represent a Cypress swamp on the confines of the states of Maryland & Delawar, in Latitude  $38^{\circ} \frac{1}{2}$  at the sources of Pocomock River. Q. Is it the same species of Cypress which is found in the Carolinas, Mississippi Territory &c?

The weather continued clear & very cold all day, we landed at the Cadaux path to make a fire and dine, the Thermometer at 3<sup>h</sup> p.m.  $32^{\circ}$  and at 8<sup>h</sup> p.m. it fell to  $26^{\circ}$ —Encamped  $1\frac{1}{2}$  league below 'petite pointe coupée', being nearly the same place where we found the latitude on the 21<sup>st</sup> November to be  $33^{\circ} 29' 29''$ ; having made by the pilot's reckoning about 15 leagues; we stopped twice to day, which has retarded us nearly two hours; our rate of going has been about  $2\frac{1}{4}$  of those leagues p: hour.

Thermometer in air  $20^{\circ}$ , in river water  $40^{\circ}$  Saturday 12<sup>th</sup>  
—river risen an inch. Much vapor ascending from the river. Part of the night was cloudy and

1805 } and this morning the heavens are not entirely  
 January } cloudless, we therefore expect an approaching  
 change of weather. The air is damp and pene-  
 trating so that it continues yet very cold on board  
 the boat; as the day advanced, it proved more  
 cloudy and disagreeable and altho' at 3<sup>h</sup> p. m.  
 the thermometer was found at 43°, the sensation  
 of cold to the human body was greater than in  
 a dry air at 22°—the face of the heavens was  
 overspread with clouds & the atmosphere ex-  
 tremely moist: we made a good encampment  
 in the evening called 'Campement des bignets'  
 (fritter camp) being about 18 of the Pilots leagues,  
 tho' not much exceeding two days of our voyage  
 up, about 37 or 38 miles by our own reckon-  
 ing; we passed this place between breakfast and  
 dinner on the 19<sup>th</sup> November. The Thermome-  
 ter at 8<sup>h</sup> p. m. 30°

Sunday 13<sup>th</sup> Thermometer in air 27° in river water 40°—  
 river risen 1½ inches—Calm. The morning  
 is very fine and the atmosphere dry, conse-  
 quently the temperature not cold to the human  
 body. These two mornings the river has risen a  
 little, notwithstanding that we have been with-  
 out rain for several days past, & it will be re-  
 membered that the three first days of this voy-  
 age, the river was found each morning to be  
 fallen; this is to be accounted for by the boat  
 gaining upon the velocity of the stream more  
 in

in the day than it loses in the night. Since we 1805  
January have got below the rapids, the current is much more gentle and we make only two of the Pilots leagues p<sup>r</sup> hour, which does not exceed perhaps 4 english miles, it appears that in nine hours (one day's) rowing down we have made the same distance which we made in 13 hours coming up, the current at the time of our ascent being nothing, and the space passed over 36 miles, it will be found from these data that in each 24 hours we gain upon the Current  $6\frac{1}{2}$  miles; we have therefore reason to conclude that we have got beyond the apex of the tide or wave occasioned by the fresh, & are descending along an inclined plane, but as we always encamp at night, it is not surprising that in the morning we find ourselves in deeper water because the Apex of the tide is constantly endeavouring to overtake us, and in the morning we find ourselves on a more elevated part of the inclined plane, which we had left behind us the evening before.

This morning no condensed vapor was visible on the surface of the river, yesterday it was considerable; hence it appears that  $13^{\circ}$  difference of temperature (the river being highest) does not condense vapor with sufficient rapidity to render it visible, altho'  $20^{\circ}$  are more than are necessary; it must not be omitted to be mentioned that this morning the atmosphere was extremely dry, and therefore greedy of moisture,  
and

1805 } and yesterday it was very moist, and consequently  
 January } not disposed to dissolve water rapidly. The day  
 proved cool, tho' not disagreeably so; the wind  
 in the afternoon N.E. and air moist: Made  
 this day by the computed distances about  $15\frac{1}{2}$   
 leagues and encamped about one league below  
 where we found our Latitude to be  $33^{\circ} 13' 16''$ .5  
 on the 17<sup>th</sup> November, so that we have again  
 completed two days voyage ascending in one  
 descending. Thermometer at 8<sup>h</sup> p.m.  $30^{\circ}$  Ex-  
 tremes  $27^{\circ}$ - $53^{\circ}$

Monday 14<sup>th</sup> Thermometer in air  $23^{\circ}$ , in river water  $40^{\circ}$ —  
 river risen  $1\frac{1}{2}$  inch. Wind very light at N.W.  
 The atmosphere is dry and the temperature  
 to the human body seems not very cold; there  
 is a thin condensed vapor upon the surface of  
 the river, the difference of temperature between  
 the river water and air being this morning  $17^{\circ}$ ;  
 yesterday the atmosphere being nearly in the  
 same state  $13^{\circ}$  were insufficient to render the  
 vapor visible. If our hygrometers were instru-  
 ments of a less dubious nature, and capable of  
 indicating by a scale the absorbing, dissolving or  
 attracting power of the atmosphere for water,  
 without being influenced by heat and cold we  
 should then be able to determine à priori at  
 what difference of temperature between water  
 and air corresponding to a given degree of the  
 hygrometer, ascending vapor will be visibly con-  
 densed.

densed. A green moss is found upon the branches of trees which are immersed in the waters of the inundation, none of the same species appears in a more elevated situation; when the waters subside vegetation does not seem entirely at a stand in those mosses which are but a foot or two above the surface, they continue to be of a lively green & hang to the length of 5 or 6 inches: the vegetation of this moss must commence under water; it may be of the same nature with the green matter deposited in fresh water conduits which has been examined by Priestly & others, & which here has arrived to a higher state of perfection from its free & open situation; it is evident this moss must vegetate under the impulse of a considerable current.

In the afternoon passed Latitude  $33^{\circ}$  and the Island of Mallet noticed in the Journal of the 15<sup>th</sup> of November: made about 19 leagues this day, being about  $2\frac{1}{2}$  day's voyage ascending; since we have got into the low alluvial Country the channel is narrower and the velocity of the current greater; we are now encamped where we passed in the afternoon of the 14<sup>th</sup> November. The day continued fine and of an agreeable temperature; at 3<sup>h</sup> p.m. the thermometer was at  $53^{\circ}$ , at 8<sup>h</sup> p.m.  $32^{\circ}$ . An eclipse of the moon will take place this night after midnight, we prepare to observe it; regulated the watch as near as possible to the apparent time at the setting

1805 } setting of the Sun ; to-morrow we shall give an  
 January } account of our observations, the sky is perfectly  
 serene.

Tuesday 15<sup>th</sup> Thermometer in air 30° in river water 40°  
 — no vapor visible on the surface of the river:  
 river risen 1  $\frac{1}{2}$  inch — wind light at S.E. cloudy.  
 Prepared last evening to observe the Eclipse  
 of the Moon, with a very indifferent Spy-glass  
 magnifying about 8 times. The commencement  
 of the Eclipse was not correctly noted,  
 occasioned by the very strong effect of the penumbra  
 in our perfectly serene & clear sky, the  
 moon not being far removed from the Zenith,  
 which induced a belief that the Eclipse had  
 actually commenced at 12<sup>h</sup> 32', this circumstance  
 produced some inattention at the instant  
 of the true commencement, which was supposed  
 to have happened at 12<sup>h</sup> 40'; but the commence-  
 ment of total darkness was observed with  
 due attention, and is believed to be as correct  
 as circumstances with our instruments would  
 admit, and took place at 13<sup>h</sup> 37'. It is believed  
 that the uncertainty of the moment of observa-  
 tion did not exceed half a minute, I am rather  
 disposed to say a quarter of a minute, for the  
 transparency of the atmosphere was as perfect  
 as can ever be expected in situations not more  
 elevated than ours. We shall ascertain the error  
 of the watch below at some known point, whose  
 latitude

latitude & position can be deduced by reference to our geographical Journal, & this we shall again perform on our arrival at the post of Washita, from which we shall gain the rate of the watch's going & the whole may be referred to the meridian of the Post & will serve to compare with the results of our lunar observations made there on our way up.

This morning the heavens are veiled by clouds; during the night the thermometer was down to  $28^{\circ}$  with a pure serene sky and the atmosphere so dry that the cold was not very sensible; this morning with a higher temperature and moist air, it is cold and penetrating. We saw this morning the first long moss (*Tilandsia*) called generally by the french 'barbe espagnole' (spanish beard) on trees growing on the margin of the river about  $2\frac{1}{2}$  leagues (5 miles) above the 'Bayou des Butes.' At this time also we emerge from the alluvial country noticed in the former part of this Journal; the banks are now of a good elevation, about 15 to 18 feet above the present level of the river & probably not liable to be inundated, whereas the alluvial lands we have just quitted, are subject to be overflowed from 8 to 12 feet; we saw none of the green moss along the alluvial tract, which I much regret, having intended to take some specimens for examination, I am in doubt whether any of the same species grows below, as yet we

1805 } we do not see it at the 'bayou des butes.' The  
 January } Sun at last broke forth and we landed to take  
 his altitude for the correction of the watch,  
 the position was recognized by the mouth of a  
 Creek, so that by a reference to the geographical  
 Journal, we found that the Latitude of this  
 point is  $32^{\circ} 49' 24''$ , being the same which  
 will correspond with  $N 10^{\circ} W 8^h 8\frac{1}{2}'$  on the  
 $14^{\text{th}}$  nov: ascending; the Sun's dble Alt: lower  
 limb was  $66^{\circ} 36' 45''$  Ind: err:  $+12' 20''$  taken  
 at  $10^h 56' 24''$  a.m.— The day became cloudy  
 in the afternoon and the thermometer rose to  
 $63^{\circ}$  which we consider as an indication of  
 rain.

We made this day nearly 15 computed leagues,  
 being the eighth day from Ellis Camp, and are  
 now encamped within five of those leagues from  
 the post of the Washita, being about a mile above  
 the place where we dined on the  $12^{\text{th}}$  November,  
 Latitude then found was  $32^{\circ} 34' 47''$ . The  
 moon and stars shine with a mild lusture, no  
 appearance of change in the weather notwithstanding  
 the increased temperature of the atmosphere.  
 Thermometer at  $8^{\text{h}}$  p.m.  $43^{\circ}$ .

Wednesday  $16^{\text{th}}$  . . . in river water  $41^{\circ}$ — river risen  $1\frac{1}{4}$   
 inch: a . . . proceeding from atmospheric  
 moisture, being very different from what we see  
 arising out of the river under considerable differ-  
 ences of temperature— Arrived at the Post of  
 Washita

Washita about noon — The day proved very fine and warm, the thermometer at 3<sup>h</sup> p.m. { 1805 January being at 65° and at 8<sup>h</sup> p.m. it remained at 60° — Found all well at the post — no news of any importance — our people all in good health except one Soldier who has been a good deal incommoded by a dysentery; but he is not in danger. Returned the hired boat.

Thermometer in air 60° in river water 44° — Thursday 17<sup>th</sup> river risen one inch. Wind at S.W. — very clear during the night but cloudy this morning — made the following observation to correct the watch and ascertain her rate of going. At 8<sup>h</sup> 53' 7" Sun's apparent double altitude of the lower limb 36° 44' 45" Ind: err: + 12' 30".

Employed the people in getting Mast and Oars for our large boat. Judging it of importance to get to Natchez as soon as possible, I determined after being disappointed in procuring horses, to take the Canoe with one Soldier and my own Domestic, and push down to Catahoola, from whence there is a road to Concord about 30 miles across the . . . [page torn].

Set off about day-break, and arrived after night Sunday 20<sup>th</sup> at the lower settlement, about 20 computed leagues from the Post. Called at the house of an old hunter with whom I had conversed on my way

1805 } way up: This man informs me that at the place  
 January } called the mine on the little Missouri, there is a  
 smoke, which ascends perpetually from a particu-  
 lar place, and that the vapor is sometimes insup-  
 portable; the river or a branch of it passes over  
 a bed of mineral, which from the description  
 given is no doubt martial pyrites. In a creek  
 or branch of the Washita called 'fourche à  
 Luke'\* there is found on the beaches and in  
 the cliffs a great number of globular bodies,  
 some as large or larger than the head of a man,  
 which when broken, exhibit the appearance of  
 Gold, Silver and precious Stones; this most prob-  
 ably is pyrites with chrystralized spar: also at the  
 'fourche des glaises à Paul',† there is near to  
 the river a cliff full of hexagonal prisms termi-  
 nated by pyramids, which appear to grow out  
 of the rock, some an inch in diameter & six to  
 eight inches long: there are beds of pyrites  
 found in several small creeks communicating  
 with the river Washita: but it appears that . . .  
 [page torn] indications on the Missouri were  
 most considered, because some of the hunters  
 actually worked upon it & sent a parcel of the  
 ore to New Orleans as observed above: it is the  
 belief of the people here that the mineral con-  
 tained precious metal, but that the Spanish Gov-  
 ernment did not chuse that any mine should

\* 3 leagues above Ellis' Camp.

† higher up the river than 'fourche à Luke.'

be

be opened so near to the British Settlements, for which reason an express prohibition was issued against any farther work being done upon the mine; since which time it has been no more spoken of. This man procured me some small roots & a few seeds of the patate à chevreuil; he also took me to the next house where I saw a solitary tree of the 'bois d'Arc' (bow-wood) or yellow wood, which was raised from a seed brought from the little Misouri; I requested some large branches, but could only obtain from the Old Lady mistress of the place, two very small ones; the fruit fallen before maturity lay upon the ground, some were of the size of a small orange, with a rind full of tubercles; the color tho' in appearance faded, still retained a resemblance to pale gold: the tree in its native soil when loaded with its golden fruit (nearly as large as the Egg of an Ostrige), presents I am told the most splendid appearance; its foliage is of the finest deep green greatly resembling the varnished foliage of the orange tree, and upon the whole no forest tree can compare with it in respect . . . ental grandeur. The bark of the young tree which I saw resembled in its texture externally the Dogwood bark; but its color is a reddish or brownish yellow; the appearance of the wood recommends it for trial as an article which may yield a yellow die: I hope to succeed in raising trees from

1805 } from the cuttings and a small Cion which I  
 January } have procured; the people suppose this tree too  
 young to mature its fruit, as it has always hith-  
 erto fallen when of the size of an orange, I am  
 inclined rather to suspect that the failure may  
 be occasioned by its open and exposed situation,  
 as it naturally grows under the shade of the for-  
 est, this tree is about six inches in diameter, it  
 is deciduous and appears to be in a sound and  
 healthy state; the branches are numerous and  
 full of short thorns or prickles, it seems to re-  
 commend itself as highly proper for hedges or  
 live fences, which are greatly wanted in many  
 parts of the United States: this tree is known to  
 exist near the Nakitosh (perhaps Lat:  $32^{\circ}$ ) and  
 upon the river Arcansa high up (perhaps in Lat:  
 $36^{\circ}$ ), it is therefore probable it may thrive from  
 Lat:  $28^{\circ}$  to  $40^{\circ}$  and will be a great acquisition  
 to a great part of the U. S. should it possess no  
 other merit than that of being ornamental.

On my way down I endeavoured to discover  
 a place said to produce Gypsum, but being with-  
 out a proper guide I failed in the research; I  
 have no doubt of its existence, and have taken  
 notes of the positions of two places where it has  
 been found; one of which is the first hill or  
 high land which touches the river on the west  
 above the large Creek called Bayou Calumet  
 and the other is the second high land on the  
 same side; as those are two points of the same  
 continued

continued ridge, it is probable that an immense body of Gypsum will be found in the bowels of the hill connecting those two points and perhaps extending far beyond them ; it has been said that fossil coal is found on the east side of the river opposite to the second hill ; it is probably Carbonated wood only : a person who pretends to have been up among the sources of the Washita 100 leagues higher than the hot springs, declares having found true mineral coal, which burns with a strong heat and bright flame without the aid of other fuel, a property which Carbonated wood does not possess. I do not give entire faith to this last report, the person who informed me being fond of the marvellous.

Continue my voyage with contrary winds and arrived the evening of the 22<sup>d</sup> at the Catahoola, which by computation is fifty leagues from the post of Washita : At this place a french man named Hebrard is settled, who keeps a ferry across the black river : here the road from Natchez forks, one branch of it leading to the settlements on the red river and the other up to the Post of the Washita : The proprietor of this place has been a hunter and great traveller up the Washita & into the western countries ; he confirms generally the accounts we have received ; it appears from what he and others say, that in the neighbourhood of the hot-springs, higher

1805 } higher up among the mountains, and upon the  
 January } little missouri, during the summer season, Explosions are very frequently heard proceeding from under ground, and not rarely a curious phenomenon is seen which is termed the blowing of the mountains, that is, confined elastic gaz forces a passage thro' the side or top of a hill driving before it a great quantity of earth and mineral matter: it appears that during the winter season the explosions and blowing of the mountains entirely cease, from whence we may conclude that the cause of those phenomena is comparatively superficial, being brought into action by the increased heat of the more direct rays of the summer-sun.

Upon my arrival at the house of M. Hebrard, I enquired for horses to carry me across the low country to Concord opposite to Natchez, the distance by the road is computed 30 miles, but it is probable the direct distance falls short of 25, and it is remarkable that the river Washita preserves a kind of parallelism to the Mississippi until it comes within the influence of the highlands of the arcansa, & thence it is deflected to the North west & probably holds a middle ground between the red river and the arcansa; the inclination of the mississippi is such that the walnut-hills are 30 miles to the east of the Natchez, the Post of the Washita will be found therefore nearly under the same meridian with that

that of Natchez very contrary to the general idea. — M. Hebrard very obligingly engaged to furnish me with horses, which it was necessary to hunt up in the woods; In the meantime I went to view the Indian mounts spoken of in the beginning of this Journal; I find this to be a very interesting place, it is the point of confluence of three navigable waters viz The Washita river, The tenza and the Catahoola, the second communicates with the missisipi lowlands by the intervention of other creeks and lakes & by one in particular called the Bayou d'argent which enters into the mississippi about 14 miles above Natchez, during high water there is navigation for batteaux of any burthen along those bayoux, a large lake called St John's lake occupies a considerable part of this passage between the Mississippi and the Tenza; it is in a horse-shoe form, & has been at some former period the bed of the Mississippi, the nearest part of it is about one mile removed from the river of the present time; this lake possessing elevated banks similar to those of the river has been lately occupied & improved; many similar possessions and improvements have been made since the first news of the cession of Louisiana by the french to the American Government; I omitted to mention in its proper place that it is understood, that even the hot-springs included within a tract of some hundreds of acres were granted by the late

1805 } late Spanish Commandant of the Washita to  
 January } some one of his friends, but it is not believed  
 that a regular patent was ever issued for that  
 place, & it cannot be asserted that residence  
 with improvement can be set up as a plea to  
 claim the land upon.

The Catahoola bayou is the third navigable stream ; during the time of the inundation there is an excellent communication by the Lake of that name & from thence by large Creeks to the red river ; The Country around the point of union of those three rivers is altogether alluvial ; but the place of M. Hebrard's residence is no longer subject to inundation for reasons which have been already assigned ; there is no doubt that as the country augments in population and riches, this place will become the site of a commercial inland town, which will hold pace with the progress and prosperity of the country. On this place are to be found a number of indian mounts, one of which is of very considerable elevation, with a species of rampart surrounding a very large space which was no doubt the position of a fortified town ; having taken some notes respecting this place, the whole will be digested and introduced into an Appendix which will be added to this Journal.

Wednesday 23<sup>d</sup> This morning is cloudy and threatens rain, the horses are not found, therefore no prospect of

of setting out to day; a little rain fell about 9<sup>h</sup> { 1805 a.m. — in the afternoon one of the horses only { January is found.

Last night there was much thunder and light- Thursday 24<sup>th</sup> ning and this morning the rain falls very fast: Having no other employment I endeavoured to collect information, here I met with an American who pretends to have been up the Arcansa river 300 leagues; the navigation of that river he says is good to that distance for boats drawing 3 or 4 feet water: I do not give implicit faith to this man, when he speaks largely of the silver which he pretends to have himself collected upon that river, and even says that on the Washita 30 leagues above the hot springs he has found silver ore so rich that 3 lib of it yielded one of silver, & that this was found in a Cave: he asserts also that the ore of the mine upon the little Missouri was carried to Kentucky by a certain Boon, where it was found to yield largely in silver: This American says he has also been up the red river, that there is a great rapid just below the raft or natural bridge & several others above it: The Cadaux Nation is 50 leagues above the raft, and near to their Village commences the Country of the great Prairies, and extend 4 or 500 miles west to the sand mountains as they are termed; those great planes extend south far beyond the red river; north over the Arcansa river and among the

1805 } the numerous branches of the Missouri. This man  
 January } confirms the accounts of the beauty and fertility  
 of the western Country &c.—

This evening the other horse has been found  
 so that I hope to set out tomorrow morning.

Friday 25<sup>th</sup> The horses being late of fetching up, we set out only at 9 o'clock; the weather was cloudy but not cold; the meeting of three rivers here which form the black river, has given it a considerable width at this place, little short I think of 400 yards. There is no apparent current here and the river is rising very fast, which is attributed to the Mississippi flowing up into the red river. The rain which has fallen these two days past, has rendered the roads extremely wet and muddy; we made only one league in the hour; arrived at the bayou Crocodile at 2<sup>h</sup> p.m. This place is considered half way from the black river to the Mississippi, & is one of those creeks which are extremely numerous in the low grounds & serve to assist in venting the waters of the inundation: the whole of the Country thro' which we have passed to day appears to be subject to the annual inundation; there are some places higher than others upon which Canes are found growing, the margins of water courses are always found more elevated than the lands at some distance, which degenerate into Cypress swamps and lakes.

At

At this place we found the waters of the Mississippi had already flowed in so abundantly, that there was a necessity to prepare a raft for crossing, & having in company three white men who understood the business, the raft was prepared of logs of the driest wood we could procure lashed together with our horse ropes and halters; after two hours delay we got to the other side of the bayou which was about 60 yards wide including the overflowed low margin of the Creek; we had yet 5 leagues to make & it was already 4 o'clock; we pushed on, but the roads were little better than mud and water for several miles together; we were unable to get on fast enough to pass over this bad part of the road before it became extremely dark, and we expected to be obliged to spend the night in the woods without fire, perhaps without a spot of dry land to rest upon: it was difficult to preserve the path; in this respect we trusted chiefly to the sagacity of our horses, at length they brought us out of the woods & at 9<sup>h</sup> p.m. We got to a new settled plantation four miles short of Concord, where we were hospitably entertained with good homely fare, particularly milk, of which I had not seen a drop upon the Washita, not even at their principal settlement; In those new Countries and all over the Opelousa Country, the Horned Cattle are in a semi-savage state, no provision is made or laid up for them during winter; in the fall of the

1805 } the year it is therefore necessary to turn out the  
 January } Calf with the Cow, otherwise she would aban-  
 don her young in the hands of its owner where  
 it would infallibly perish; the Cattle move off  
 in search of winter food & the proprietor fre-  
 quently knows nothing of the situation of his  
 stock, till the warm weather of the Spring &  
 Summer season calls them out in search of the  
 young tender herbage of the open fields.

Saturday 26<sup>th</sup> Set out in the morning with a very cold freez-  
 ing air; I now think it extremely fortunate that  
 we were not detained last night in the woods, as  
 we certainly should have spent a very disagree-  
 able night. Arrived in an hour at Concord; the  
 settlement of this place has commenced only  
 since the treaty of limits between the U. S. and  
 Spain, but it has received its most considerable  
 augmentation since the cession of Louisiana to  
 the U. S. by citizens of the Mississippi territory  
 who have either established their residence alto-  
 gether upon newly acquired lands, or what has  
 perhaps been equally common, have taken up  
 tracts of land under the authority of the Spanish  
 Commandant & have gone to the expense of  
 improvements either in their own names or in  
 the names of others before the 20<sup>th</sup> of December  
 1803 hoping thereby to hold their new posses-  
 sions under the Sanction of the law. Exclusive  
 of the few actual residents on the banks of the  
 Mississippi

[ 189 ]

Mississippi, there are two very handsome lakes { 1805  
in the interior, on the banks of which settle- { January  
ments of a similar nature have been made.

Crossed the ferry and breakfasted at Natchez  
and arrived at my own house at ten o'clock  
where I had the satisfaction to find my family  
all well.



JOURNAL of a Geometrical Survey  
commencing at S<sup>t</sup>: *Catherine's* landing  
on the East shore of the *Mississippi*  
descending to the mouth of the red  
river, and from thence ascending that  
river, the black river and river of the  
*Washita* as high as the Hot Springs in  
the proximity of the last named river.



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## Preamble

THE distances are taken by time from a portable chronometer, and proportioned by a log-line divided into perches, run out for half a minute: consideration was always had for the velocity of the Current by deducting it immediately from the rate per log, when it merited attention: it is to be understood that the rate per log noted, continues the same untill it is again noted with change.

All meridian or other altitudes of the Sun above the horizon, noted in the following Journal, are to be understood of the lower limb, unless otherwise expressed.

An excellent Circle of reflection with a triple Index, made by Troughton of London graduated to 10" of a degree, was used for taking altitudes, lunar distances &c; this Circle is supported on a pedestal which gives it a solidity & perfection never to be expected from any instrument held in the hand; the index error was regularly ascertained immediately after taking a meridian altitude, by observing the Sun's contact with his reflected image both above and below: for facility in practice the greater contact was added to the apparent double altitude when the index error was additive; and the lesser contact was added when the error was subtractive; which includes the Sun's semi-diameter and the correction of the index error giving at once the apparent double altitude of the Suns center, being careful to subtract the correction of refraction from the altitude of the lower limb only: altho' this was my

practice, I have agreeably to custom given always the Index error: some small differences will be found in calculating the Latitudes, arising from my practice, of preferring the Suns semidiameter taken from my instrument (generally smaller) to that found in the nautical almanack, M<sup>r</sup>. Maskelyne astronomer royal has long since observed that the Sun's diameter as taken from Mayer's tables is 3" too much, I observe that this error is corrected in the almanac for 1805.

The rate of going of the Chronometer having been frequently changed by being carried in the pocket, it was not proposed to depend upon its keeping the Longitude otherwise than as a good second hand watch to note the instance of astronomical observations, and was always preserved carefully in a horizontal position untill a connected series of observations was completed, during which time it is believed that the rate of going was sufficiently equable.



*Journal of a Geometrical Survey* commencing at S<sup>t</sup> Catherine's landing on the East shore of the Mississippi descending to the mouth of the red river, and from thence ascending that river, the black river and river of the Washita as high as the Hot Springs in the proximity of the last named river.

THE following courses and distances from S<sup>t</sup> Catherine's landing to the mouth of the red river were taken on the return of the boat at the termination of the voyage, but are now placed with more propriety at the commencement of the survey.

South 210 perches.

S 70 W 1212 . . . . at 810 Hootsell's plantation on the right 1½ mile above the Island.

S 30 W 120 passed between the Island and right bank.

South 240

S 40 E 210

S 30 E 240

S 20 W 930

S 60 W 240

West 492

S 35 W 282

S 20 W 189

S 5 W1470 At 1418 passed Homochilo river on the left.

S 40 E 528

S 20 W 600

S 50 W 540

S 20 W 420

S 60 E 595

S 75 E 925 At 805 Buffalo river on the left; arrived at Fort adams.

S 30 W2250 At 1940 the Line of demarcation on the left  $31^{\circ}$  North Lat : &  $6^{\text{h}} 6' 42''$ .  
Long: West of Greenwich; the last by M. DeFerrer.

S 60 W 40

N 65 W 160

N 15 W 360

N 40 W 312

N 60 W 120

N 85 W 960 to the mouth of Red river.

## RED RIVER

ARRIVED at the mouth of the Red river the  $\{ 1804$   
 evening of the 17<sup>th</sup> of October: The Latitude  $\{ October$   
 and Longitude of this place having been accurately  
 ascertained by Doctor Jose Joakin de Ferrer, we did  
 not think it necessary to lose any time on that account  
 — Lat  $31^{\circ} 01' 15''$  North, and Long:  $6^{\text{h}} 7' - 11''$  west  
 of Greenwich — proceeded to take the Courses and  
 distances of the Red river as follows, beginning at the  
 mouth of the river on the right margin.

Thursday, 18<sup>th</sup>

N  $14^{\circ}$  E  $0^{\text{h}} 23'$  to a point on the same side: rate  
 p<sup>l</sup> Log 4 per: p<sup>l</sup> half minute, no  
 opposing Current. River 550 yards  
 wide.

N  $8^{\circ}$  W  $- .47$  to a point on the left side.

N  $20^{\circ}$  W  $- .23$  to a point, right bank.

N  $5^{\circ}$  E  $- .5$  along shore. River 300 yards wide.

N  $22^{\circ}$  E  $- .22$  to a point left side — a Creek to  
 the right.

N  $10^{\circ}$  W  $- .9$  along shore. Rate of going 4 per.

N  $25^{\circ}$  W  $- .6$  . . . d<sup>o</sup>.

N  $45^{\circ}$  W  $- .11$  a lake on the right side.

N  $80^{\circ}$  W  $- .22$  to point right side.

N  $40^{\circ}$  W  $- .4$  — river 250 yds wide.

N  $10^{\circ}$  W  $- .4$  — no sensible current.

N  $32^{\circ}$  E  $- .17$  to a p<sup>l</sup> on the left 200 yds wide.

N  $25^{\circ}$  W  $- .11$  to a p<sup>l</sup> on the right.

1804  
October }

N<sup>o</sup> 10 W-.16 to a p<sup>o</sup> on the left.  
 N<sup>o</sup> 15 W-. 6 to a p<sup>o</sup> on the right.  
 N<sup>o</sup> 25 W-.27 to a p<sup>o</sup> same side, a bend to the right.  
 N<sup>o</sup> 38 W-. 7 along shore.  
 N<sup>o</sup> 40 E -.20 d<sup>o</sup>  
 S 75 E -.42 to a p<sup>o</sup> on the left.  
 N 40 E -. 7 along shore.  
 N 5 E -.41 to a p<sup>o</sup> on the right.  
 N 40 E -. 6 to a p<sup>o</sup> on the left — a large Creek on the right.  
 N<sup>o</sup> 80 W-.24 to a p<sup>o</sup> on the right.  
 N<sup>o</sup> 10 E -.13 along shore.  
 N<sup>o</sup> 75 W-.23 along shore.  
 S 85 W-.16 d<sup>o</sup>  
 N 75 W-.19 d<sup>o</sup>  
 S 50 W-.46 to a point on the right. Made this day 12 Miles 296 perches.

Friday 19<sup>th</sup> Thermometer before Sun rise 46°  
 N 75 W 0<sup>o</sup>.19 to a point on the left. Rate 7 perches per  $\frac{1}{2}$  Minute.

Same course 0.27 to do. on the right.  
 N 30 W 0.30 along shore.  
 W 0.11 . . . d<sup>o</sup>  
 N 60 W 0.14 a point on the left: rate of going 7 perches per  $\frac{1}{2}$  Minute.  
 W 0.23 along shore.

Same course 0.26 a point on the right.  
 N 75 W 0.33 along shore.  
 N 50 W 0.26 to a point on the left: at 5' a Creek on the left.  
 N 70 W 0.22 a point on the right; wind contrary hove the log rate of going 4 perches.

## BLACK RIVER

9

N 35 W 0<sup>1</sup>.22' along shore.  
N 10 W 0.13 a point on the left, landed to ob- { 1804  
serve and dined. October  
Face of the Doub. ap. alt. ⊖ lower limb 97° 0'-  
Circle West 0" In : er : -13' 21".5 Lat: found  
31° 15' -48".  
N 60 W 0.40 a p' on right . . rate 5 perches.  
N 50 W 0.20 along shore to the mouth of black  
river 150 yds wide, red river the  
same width; entered Black river.  
N 35 E 0.25 a point on the left.  
N 10 E 0.31 along shore.

## BLACK RIVER

N 40 W 0<sup>1</sup>.16' along shore. river 100 yards wide.  
S 75 W 0.20 to a point on the right: sounded  
20 feet, black sand, encamped for  
the night; made this day 15 miles  
102 perches.  
Saturday 20<sup>th</sup> Thermometer before Sunrise 47°.  
W 0.30 along shore — hove the Log, 4  
perches per  $\frac{1}{2}$  min.  
N 45 W 0.45 to a point on the right — tempera-  
ture of the river 73°.  
N 10 W 0.28 to a point on the left — Chalybeate  
spring, temperature 66°.  
N — 0.16 along shore.  
Same course 0.42 to a point on the right  $6\frac{1}{4}$  perches  
per log.  
N 20 W 0.30 along shore rate of going 4 perches  
per log.

1804 } N 50 E 0<sup>h</sup>30' along shore river 80 yards wide —  
 October } Canes on the right.  
 E 0.10 to the left shore landed to observe  
 at noon & dine.  
 Face of the ⊖ doub: mer: ap: alt: 95°-34'.  
 Circle East 5''. In: er + 13' - 32''. 5 — Lat found  
 31° 22' 46''. 6.  
 S 75 E 0.58 to a p: on the right & continue to the  
 left — Log 4½ perch per ½ Minute.  
 N 63 E 0.47 to a point on the right and continue  
 to a point of the left; Thermom-  
 eter at 3<sup>h</sup> 80°.  
 N 25 E 0.40 along shore — Canes on the right.  
 N 45 W 0.27 along shore.  
 S 80 W 1. 6 . . ditto; encamped for the night.  
 Soundings 5 fathoms, black sand.  
 This day's voyage makes 13 miles  
 40 perches.  
 Sunday 21<sup>st</sup> last } Thermometer before sun rise 60°  
 course continued } a little cloudey near the Horizon.  
 S 80 W 0.48 along shore.  
 N 45 W 0.51 to an Island; rate per log 4½  
 perches.  
 N 13 W 1. 3 hoist sail, rate per log 8 perches:  
 cane brake, little settlement.  
 N 20 E 0.25 to a point on the left. Rate per log  
 4½ perch.  
 N 25 W 0.14 to a point on the right.  
 N 40 E 0. 6 to the left; landed to observe and  
 dine, clouds came over just at the  
 moment before the Sun came upon  
 the meridian, went off in a little  
 time, he had dipped: the double  
 alt: is 94° 37'. 0".

## BLACK RIVER

11

In'er : + 13'. 34" which is too small, { 1804  
the latitude is too far north. { October

N 75 E 0.40' along shore.

N 40 E 0.22 ditto Thermometer 83°

S 30 E 0.23

Same course 1. 6 (sent the men to track) along shore,  
rate per log 5 perches.

S 13 E 0.46 continue tracking; cross and go on  
to a point on the left.

N 75 E 0.35 to the right—encamped for the  
night. Extremes of the Thermom-  
eter 60° to 83° cloudy; wind S.S.E.  
made this day 14 Miles 59 perches.

Monday 22 — Thermometer before Sun rise 65°  
Wind S.S.E. cloudy, rain before  
day.

Continued

N 75 E 0.20 to a point on the right.

S 65 E 0.35 along shore — by log 5 perches per  
 $\frac{1}{2}$  Minute.

E 1.14 to a point on the left, cloudy.

N 0.30

Hoist sail

N 40 W 0.18 to a point on the left — by Log 8  
perch's per  $\frac{1}{2}$  Minute.

Wind fails

W 2.12 to a point on the right — by Log  
4 perches, long reach, rain at noon,  
no observation.

N 20 W 0.35 along shore — Thermometer 79°.

N 40 E 1. 3 to a point on the left — by Log 5  
perches.

N 10 W 0.19 along shore.

N 45 W 0.20 to a point along shore — sounded

1804 }  
October }

3  $\frac{1}{2}$  fathom, black sand — extremes  
of the thermometer 65° to 79° made  
this day 13 Miles 76 perches.

Tuesday 23<sup>d</sup> Thermometer 68° before sun rise.

Wind N.N.W. the river fell 3  
inches in the night.

N 65 W 2° 5' along shore by log 5  $\frac{3}{4}$  perches.

N 10 W 0.50 to a point on the right.

N 10 E 0.38 along shore contrary wind — by  
log 3  $\frac{3}{4}$  perches observed O Doub:  
alt: 92° 58'.45". In: Er: +13'.  
dinner 45".5.

continue

N 10 E 0.50 along shore.

N 30 E 0.15° to the left shore, wind N.N.W. ar-  
rived at the mouth of Catahoola,  
West course; thermometer 75°.

N 10 E 0. 8 the mouth of Washita: Bayu Tensa  
forks with Washita bearing N 80°  
E: log 5  $\frac{3}{4}$  perches.

N 65 W 0. 7 along shore on the right: encamped.  
Extremes of the thermometer 68°-  
75° took information at the mouth  
of the Catahoola which detained us  
2  $\frac{1}{2}$  hours; sounded, 6 fathoms;  
made this day 9 miles 77  $\frac{1}{2}$  perches.  
By our reckoning the mouth of  
Washita is distant from the mouth  
of Red river 77 miles 57 perches;

and by the old estimation 32 french leagues. 1804  
October

Wednesday 24 Thermometer before sunrise 54°  
Wind North, cloudy, temperature of the river 71° no current worth estimating.

N 65 W 0° 9' continued to the right shore — rate of going per log 4½ perches.

N 35 E 0.23 along shore.

N — 0.20 ditto — high land on the right.

— W 0.12 ditto, by log 5 perches. Bayu Ha-ha on the right coming in f. East.

— N — 0.12 ditto, oblique strata of clay, some dipping under y° horizon 30° in the direction of the river.

N 60 E 0.11 to the left shore.

breakfast

N 30 E 0.27 along shore by log 5 perches cloudy.

N 45 W 0.13 ditto, river 80 yards wide.

W 0.18 to a point on the right luxuriant vegetation, grapevines, &c in rich dark festoons.

N 30 W 0. 6 along shore.

N 30 E 0. 3 clearing up — wind north.

N 50 E 0.19

N 0.49 landed on the right to observe ☽  
Doub: alt: 92° 4'. 50" In: = er:  
+ 13'. 45" land high no appearance of overflowing, oak forest, white, red, black, rich shrubbery. Lat: found 31° 42' 30". 5.

dinner continued

N 0.42 to the right shore.

1804 }      N 55 W 0.31' rich herbage along shore.  
 October }      N 40 E 0.11 along shore — low and small timber, upon the high bank.  
 N 70 E 0.17 along shore }  
     E 0.17 ditto }  
 N 45 E 0. 5 ditto }  
 N      0. 8 ditto }  
 N 60 W 0.83 ditto }  
     W 0. 9 } continue taking all  
     S 72 W 0.24 to the left — a large bayu going to  
     S. W. called Barchelet.  
 N 15 W 0.39 made this day 14 miles 48 perches.  
 Thursday 25 Thermometer 49° temperature of the  
     river 68° Wind North, cloudy.  
 contin<sup>d</sup>  
 N 15 W 0.20 at 12'. pine point on the left, and  
     Villemont's prairie on the right, per  
     Log 4 perches.  
 N 45 E 0. 3 to a point on the right — high land.  
     E 0.43 at 3'. bayu on the left.  
 N 20 E 0.29 to Bayu Louis on the right, here  
     commences the rapids.

## Breakfast.

N      1 mile so many shoals in this course  
     that no time or log could be kept —  
     by estimation we went one mile and  
     then were completely embayed, being  
     enclosed by a bar of gravel and  
     sand with only 8 to 12 inches of  
     water; cloudy, no observation;  
     This day we made only 3 miles  
     120 perches.

Friday 26 Thermometer 40° Wind N.W. light  
     clouds took

At 10<sup>42</sup>'. A. M. Obs. dble alt : 82° 9'. 10" In : er : + 13'. 48" to regulate the watch. 1804  
 At 11 .20.45 Do 88.10 . 5 Magnetic Azim : October  
 S 20 $\frac{1}{4}$  E.  
 At noon took the Obs. mer : alt : (doub) 90° 30'. 10"  
 In : er : + 13'. 48". Lat. 31° 48'. 57". thermometer at 3 o'clock 70°

Saturday 27<sup>th</sup> Thermometer 32° temperature of the river 64° wind North, clear above — a fog on the river. no observation all our efforts being employed Course continued }  $\frac{3}{4}$  mile North } to get through a gravelly bar un- till 1 o'clock; the rapids continu- ing occasioned frequent stops so that we could only estimate the remainder of this course at  $\frac{3}{4}$  of a mile; the rockey pass which completed the rapids being 200 yards from the end of this last course.

— W 0<sup>8</sup> 15' to a point on the right — per log 4 $\frac{1}{2}$  perches.

N — 0.38 at 11 a bayou on the left — a point on the left: encamp: extremes of the thermometer 32°—73°: this day made 2 miles 77 perches.

Sunday 28. Thermometer 40° temperature of the river water 63° wind N.W. — clear above — fog on the river.

N 45 W 0.17 rate by log 4 $\frac{1}{2}$  perches.

N 0.17 at 5'. a prairie or natural meadow on the left to a point on the left.

N 15 W 0.13 Bayoo Boeuf on the right at 5'. Rockey hill on the right.

N 45 W 0.17

N 15 E 0.18

N 70 W 0.20

1804 } S 55 W 5° 10' on the right—here we made the  
October } following observations

A. M.  $\odot$  doub: alt:  $53^{\circ} 19' .00''$ . at  $9^{\text{h}} 5' - 16''$ . — Mag: Az: S  $60^{\circ} E$   
 do  $58^{\circ} 14' .10''$  at  $9^{\text{h}} 20' - 28''$ .  $d^{\circ}$  S  $57^{\circ} E$   
 In: Er:  $+ 13^{\circ} .58''$ .

Same course 0.6 on the right, tracking the boat; by log 5 perches.

W o. 14 ditto.

N 10 E 0.14

N 10 W 0.17

Wo.17

**Contin<sup>d</sup>**

S 10 W 0. 8

S 78 W o. 8

S 80 W 0.10

N 30 W 1. 8 a large prairie or savannah on the right — thermometer  $78^{\circ}$  at 3<sup>h</sup> the plane is named "Prairie noyée."

S 45 W 0.32

N 45° W 0.13 to the left.

N 80 W 0.31

S 45 W o. 15

S 30 E 0.16

S 82 W 0.12 to the encampment. S

fathom, mud and sand, made this day 12 miles 116 perches.

Note the rate of going of the watch to be ascertained from the

morning altitudes of the Sun of  
this day and the 26<sup>th</sup> { 1804  
October

In future I have determined to take down the distances by the hour and minute as first placed upon the slate or blotter, being less liable to error; the differences as above stated may be taken afterwards at leisure.

Monday 29<sup>th</sup> Thermometer 41° temperature of the river water 62° wind N.W. fog on the river.

Set out at 6<sup>h</sup>22' rate per Log 5½ perches.

S 32 W 6.31

N 35 W 6.40

N 65 W 7. 8

W 7.20 to the right bank.

N 45 W 7.30 to the left.

N 55 E 7.48 a Creek on the left: landed and made the following observations of the distances between the nearest limbs of the sun and moon.

A. M. At 8<sup>h</sup>57'.10" dis: 41°58'.20" } In: Er:  
9. 6.10 . . . 41.55.40 }  
9.26.18 . . . 41.50.10 } + 13'.45"  
Took the following doub: alt: of the Sun and azimuth.  
At 9<sup>h</sup> 47'. 46" doub: alt: 68° 44'.30"  
Sun's magnetic Az: S 45° E.  
In: Er: the same + 13'. 45".

Set off at 10<sup>h</sup> 4'.

N 55 E 10.20 rate per log 5½ perches.

N 30 W 10.31

N 15 E 10.43

1804  
October }

— W 11. 1'

N — 11. 7

N 45 E 11.41

— W 11.47 took the ⊖ mer: ap: doub: alt:  
88° 10'. 00" In: Er: +13'. 45"  
Lat: found 31° 58'. 2".

dinner 1.12 p.m.

Contin<sup>d</sup> W 1.19

N 25 W 1.42

N 65 W 2. 4 to the left.

N — 2.35

N 45 W 2.46

N 85 W 3.15 rate per log 6 perches thermom-  
eter 85°

N — 3.25

N 85 E 3.58 lost 4'. Cliffs and pine woods,  
soil thin greyish sandy loam.

N 80 W 4.14

N 45 W 4.32

S 55 W 4.55 Wind S.W. Log 5 perches.

W 5.13

N 35 W 5.28

N 55 E 5.35 to the right encamped. Soundings  
3 fathom, thermometer 62°

Note. The watch having been  
suffered to run down last night,  
the times of the altitudes of this  
day have consequently no connec-  
tion with the former. This day  
made 14 miles 65 perches.

Tuesday 30<sup>th</sup> Thermometer 47° temperature of the  
river water 60° fog on the river  
wind W.N.W. clear.

Set off at 6. 5

N 75 E 6.26' rate per log 5 perches.      1804  
 N 20 E 6.34      October

N 70 W 7.10

S 50 W 7.35 lost 2'.

W 7.50

Breakfast 8.47

N 10 W 9.12

N 40 E 9.25

N 82 E 9.47

N 68 W 10.25

S 50 W 10.55 wind W.

N 50 W 11. 7

N — 11.14

N 60 E 11.34 landed and took the Suns mer:  
 doubt: altitude 87° 16'. 10" In:er:  
 + 13'.20", some uncertainty at-  
 tended this observation; the alti-  
 tude observed may have been a  
 minute too small, which would  
 place the latitude  $\frac{1}{4}$  minute too  
 far north; it is however recorded  
 with this remark latitude found  
 32° 5'. 24".

Set off at 1.20

N 50 W 2. 8 rate per log 5 perches.

N 30 E 2.35

N 45 W 2.42 wind W.

— W 2.48

S 60 W 3.37 lost 9'.

N 55 W 4. 7 lost 4'. a rapid: river 30 yards wide.

N 60 E 4.28

N — 4.34

— W 5.15 lost 14' creek on the left, perhaps  
 Bayu Calumet.

1804 }      N — 5:25' to the left — encamped extremes  
 October }      of the thermometer 47°-83°. Made  
             15 miles 150 perches.

Wednesday 31 Thermometer 44° river water 62°  
 Wind N.W. Clear.

Set out at 6.30

N 45 E 6.50 strong current, rate per log re-  
 duced, 2 perches.

N 20 W 6.55

S 65 W 7.46 lost 5'.

N 40 W 8.10 got upon a shoal: breakfasted.

Set off 9.58

N 40 W 10.44 lost 10'

N 10 W 11.18

N 25 E 11.35 per log 4½ perches: landed and  
 took the Suns apparent: mer:

double alt: 86° 27'. 10" In: er:

dinner + 13'. 40" latitude found 32° 10'.

13" at seting out got upon a bar  
 which detained us.

Set out again

at 2.00 got over the bar.

N 25 E 3.00 lost 6'. per log 4 perches.

N 74 W 3.10 a small plantation on the right.

S 25 W 3.35 Thermometer 84°

— W 3.40

N 5 W 4. 8

N 35 W 4.45 to a small plantation — another  
 joining below: this day made 6  
 miles 165 perches.

November } Thermometer 48° river water 62° calm  
 Thursday 1<sup>st</sup> } clear.

W ½ mile. The first part of this  
 course could only be estimated by

the eye, as a great part of this 1804  
morning was employed in getting November  
over a rapid, which we effected  
about 12 (noon) it may be put  
down at half a mile.

Set off after 2:20'  
dinner

continu'd W 2.33 rate by log 3 perches against a  
current.

N 40 W 3.12 a cliff 100 feet crowned by pines,  
lost 14'. this course upon a shoal.

N 30 E 3.14  
E 3.42 lost 2'.

N 30 E 3.44 rate per log  $4\frac{1}{2}$  perches.

N 15 E 3.54 Thermometer  $85^{\circ}$

N 45 E 4.36 lost 22' upon a shoal.

N 25 E 4.40  
W 5.24 a sand bar half way across: river  
50 yards wide.

N 70 W 5.44  
N 5.50

N 45 E 5.55 at 8<sup>h</sup> thermometer  $64^{\circ}$  extremes  
 $48^{\circ}$  -  $85^{\circ}$  made this day 4 miles  
115 perches.

Friday 2<sup>d</sup> Thermometer  $48^{\circ}$  river water  $62^{\circ}$   
light clouds; wind S.S.E. a little  
fog on the river.

Set off at 6.50

N 45 E 7.16 rate per log  $4\frac{1}{2}$  perches.

N — 7.23

N 65 W 7.30

S 55 W 8.26 lost 3'.

breakfast 9.19

W 10.00 lost 20' on a shoal.

1804 } N 55 W 11<sup>54</sup>' lost 1 $\frac{1}{2}$  hour on a log under  
November } water.

N 10 E 12.30 lost 7' on a shoal.

N 15 W 12.53 landed to dine.

Set of at 2.25 got immediately upon a log and  
after getting off set out again at  
4.00 Thermometer 84°

N 75 W 4.14

N 25 W 4.30

N — 4.37 a cliff and pine hill on the left.

N 85 E 4.50

S 80 E 5.23

N 30 E 5.39 lost 4'.

N 45 W 5.50 encamped at a sand bar on the  
right made this day 8 miles 104  
perches.

Saturday 3<sup>d</sup> Thermometer 52° river water 64° light  
clouds.

Set out at 6.19

N 45 W 6.34 by log 4 $\frac{1}{2}$  perches.

N 22 W 7.12

N 40 E 7.22

S 70 E 8.10 lost 25' on a shoal.

breakfast

Set out at 9. 8

S 70 E 9.42

S 40 E 9.47

S 10 E 10.00 lost 3'.

S 40 E 10. 5 rate per log 5 perches.

S 75 E 10.11 wind E S E.

N 10 E 10.34 lost 5'.

N 50 E 10.47

E 11.00

S 45 E 11. 8

11<sup>th</sup> 15' stoped by a shoal.

S 10 E 11.23 went ashore & prepared to ob- { 1804  
serve. November

Set out after 1.31 ⊖ ap: do: alt: 84° 18'. 40. In:  
dinner. er: + 13'. 30". Lat: 32° 17'. 17".

Set out at 1.31 after dinner.

S 10 E 1.38

S 60 E 1.45 towing the boat rate 5½ perches.

N 60 E 1.55

N 30 E 2. 4

N — 2.17

2.32 stop upon a shoal.

N 20 W 2.45

N — 3. 5 lost 3'. thermometer 86°.

N 45 W 3.25 lost 10'. rate per log 4½ perches.

S 65 W 3.57 lost 14'. upon a shoal.

N 45 W 4. 3

N 20 E 4.20 lost 8'. — towing, rate per log 5½ perches.

N 45 E 4.35 current — rate 4 perches.

N — 5. 5 lost 9'.

N 45 E 5.15 encamped on the left, Thermometer at 8<sup>th</sup> p. m. 72° made this day 11 miles 140 perches.

Sunday 4<sup>th</sup> Thermometer 54° river water 64° clear.

Set off at 9.18 got aground in the morning.

N 45 E 9.26 rate per log 4 perches.

N 25 E 9.36

N 20 W 9.44

N 45 W 10.26 lost 16' upon a shoal.

S 75 W 10.50 lost 3'.

N 65 W 11.00

N 50 W 11.29 landed and observed the ⊖ ap:  
mer: alt: double 83° 33'. 45".

1804

November }

In: er: 13'. 32". Lat: 32° 21'.  
10".

Set out at 1:36'

N 20 W 3.25 lost 57' upon a shoal rate per log  
2 perches.

Same course

N 20 W 4.00 lost 12' got out the tow line to  
track; per log 5½ perches.N 20 E ½ mile this course being over  
shoals and rapids could only be  
estimated by sight made this day  
4 miles 233 perches.Monday 5<sup>th</sup> Thermometer 52° river water 62° heavy  
fog, had to unload two turns of  
our canoe to get over a shoal.

Set off at 9.55

Last course

Cont<sup>d</sup> 10. 4 rate per log 5 perches.

N 20 W 11.15

N 45 W 11.21 lost 3'.

— W 11.32 dark misty and cloudy.

N 45 W 12.00 lost 5'.

N 45 E 12.13

N 25 E 12.42 lost 2'.

N 45 E 1.34 lost 10'.

N 10 W 1.43 wind N.W. dined.

Set off at 3.00

N 75 W 3.12 rate per log 6 perches.

S 50 W 3.55 Thermometer 68° Sun shines  
dimly through a blackish mist.

— W 4. 2

N 60 W 4.25 lost 2'.

N 30 W 4.39

N — 4.55

N 35 W 5<sup>h</sup> 8'N 15 W 5.25 encamped on a sand bar on the { 1804  
right made this day 11 miles 276  
perches.Tuesday 6<sup>th</sup> Thermometer 45° river water 64° heavy  
fog, wind west.

Set out at 6.32

N 80 E 6.48 rate per log 5½ perches.

S — 7.10 lost 1'.

S 45 E 7.30

E 7.40

N 65 E 7.55

Breakfast 8.57

Conti<sup>n</sup>d.

N 65 E 9.42 rate per log 4½ perches.

N 35 E 9.55

N 45 W 10.28 lost 5'.

N — 11.13 lost 3'.

N 40 W 11.18

S 65 W 11.30 landed and observed ☽ apparent  
double altitude 82° 5'. 33". In : er:  
+ 13'.30". latitude found 32° 28'.  
58".

Dinner 1.30

Cont<sup>nd</sup>

S 65 W 1.52 rate per log 5 perches.

S 60 W 2.00

N 10 W 2. 6

N 15 E 2.20

E 2.25

S 55 E 2.47

N 70 E 2.52

N — 2.55

N 25 W 3.25 arrived at the post of Washita.

1804  
November }

made this day 9 miles 257 perches amounting in the whole from the mouth of Red river 196 miles and 256 perches.

Wednesday 7<sup>th</sup> Took the ☽ ap: mer: doub: alt: 81° 28'. 00" In: er: +13'. 33". 5 latitude found 32° 29'. 52". 5. The place where the observation was made is about 450 feet to the south of the post where Lieut: Bowman and his garrison are stationed, the latitude of the post is therefore 32° 29'. 57".

8<sup>th</sup> & 9<sup>th</sup> Both cloudy days remained at the post.

9<sup>th</sup> Thermometer 42°-72° river 61°.

Saturday 10<sup>th</sup> Thermometer 40° made the following observations.

			by cal.
			var?
			found
A. M.	10.00.18". ☽ ap. dble lower limb Alt 63°. 5'. 50" ☽ mag: Az S 46 E	In: er: +13'. 47". 5	10°. 9'.
	10.12.15 65.56.53 S 43 E		10 .8
	10.16.12 66.50.34 S 42 E		10 .8

☽ Ap: mer: dble: Alt: 79° 45'. 3"  
In: er+13'. 47". 5 Lat: found 32° 29'. 35".

There is a difference of 17". between the Lat: found this day and on the 7<sup>th</sup>. I give the preference to the observation of this day, because on the 7<sup>th</sup> some interruption from visitants occasioned a moments inattention and it is believed the Sun might have dipped a little before the altitude was taken.

## ○ triple contact as follows

P M.  $\left\{ \begin{array}{l} \text{Lower limb a } 3-1-6 \\ \text{Center } 3-2-50 \\ \text{Upper limb } 3-4-36 \end{array} \right\}$  Cap: D: Alt:  $49^{\circ} 15' 30''$ .  
 In: er:  $+13' 47'' .5$ .

$\left\{ \begin{array}{l} 1804 \\ \text{November} \end{array} \right\}$

Note the center contact was uncertain from intervening branches. Distances between the Sun and moons nearest limb are as follows.

P M.  $\left\{ \begin{array}{ll} \text{dis: } \odot & \& \text{C limbs} \\ \text{At } 3.26' .49'' & 92^{\circ} 34.00 \\ 3.33 .43 & 92 .35 .55 \\ 3.39 .56 & 92 .38 .25 \\ 3.42 .36 & 92 .39 .00 \\ 3.46 .5 & 92 .40 .00 \\ 3.50 .14 & 92 .41 .50 \end{array} \right\}$  Index er:  $+13' 47'' .5$ .

## Triple contacts of the moons limbs and center.

At 4<sup>h</sup> 1'.11'' upper limb  
 4 . 3 . 1 center  
 4 . 4 . 52 lower limb } Cap: D: Alt:  $62^{\circ} 55' .00$   
 At 4 . 8 . 55 upper limb  
 4 . 10 . 41 center } Cap: Dble: Alt:  $64^{\circ} 37' .45''$   
 4 . 12 . 24 lower limb } In: er:  $+13' 47'' .5$ .

These contacts of the moon are not to be considered as so perfect as similar contacts of the Sun, on account of the pale light of her disk in the presence of the Sun, the illuminated part being also but a small proportion of the whole disk, the following mer: alt: of the moon taken in the evening was very correct . . . Cap: mer: dble: alt:  $89^{\circ} 17' .20''$  In: er:  $+13' 47'' .5$ , these were taken, because the moon's alt: could not be taken at the same instants with the distances between the Sun and moon's limbs

1804  
November }

and may be used or not as a check  
at the pleasure of the calculator.

Distances of the moons west  
limb from  $\alpha$  arietis

At  $7^h 42' 57''$  Distance  $71^{\circ} 45'.00''$   
 $7^{\circ} 51' .27$                      $71^{\circ} 42' .15$  } In : er : -  $13' 47\frac{1}{2}''$ .  
 $7^{\circ} 59' .38$                      $71^{\circ} 38' .55$

Sunday 11<sup>th</sup> Thermometer 24° At the post of Washita  
took the sun's ap : mer : dble : alt :  
 $79^{\circ} 12' 7''$  In : er : +  $13'.32''$ .5  
Lat :  $32^{\circ} 29' 30''$ .5.

Set out at  $3^h 54'$  from the post of Washita.

N 45° W 4.30 lost 2'; per log 8 perches per  $\frac{1}{2}$  minute.

N 30° W 4.55 to Baron Bastrop's plantation ;  
encamped, made this afternoon 3 miles. The meridian observations  
of this day and yesterday for the  
Lat : being in my opinion both as  
good as the instrument admits, I  
take the mean of the two for the  
truth, and as the distance of the  
post from the place of observa-  
tion is 450 feet North, I consider  
the true latitude of the post as  
fixed at  $32^{\circ} 29' 37''$ . 8.

Monday 12<sup>th</sup> Thermometer in air 36° in river water  
54° clear, calm.

Sett off at 8.26 took in some fresh beef &c.

N 55° E 8.35 rate per log 8 perches.

N 8.39

N 60° W 9.15 lost 24' upon shoals.

N 10° W 9.20

N 25° E 9.40

N  $9^h 46'$  Bayu Siard on the right computed  $\begin{cases} 1804 \\ 2 \text{ leagues from the Fort.} \end{cases}$  November

N  $70$  W  $10.15$  river 100 yards wide.

N  $30$  W  $10.23$  at  $10^h 20'$  Bayu d'Arbonne, enter a narrow passage to the left which contains the whole river, being shut up on the right except during freshes: the course of the old river upwards is east: and the new channel with high banks is from 30 to 40 yards wide.

N  $30$  E  $10.25$

N  $60$  E  $10.31$

E  $10.33$

S  $45$  E  $10.45$  at  $10.39$  return to the great river.

N  $60$  E  $10.55$

N  $30$  E  $11.20$

E  $11.50$  landed to observe  $\odot$  mer: ap: dble: alt:  $78^{\circ} 28' 52''$  In: er:  $+13' 31''$  Latitude  $32^{\circ} 34' 47''$ .

After dinner

set off at  $1.48$

Continued

E  $1.53$

N  $2.00$

N  $70$  W  $2.10$

N  $2.15$

N  $40$  E  $3.3$  at  $2.30$  a rapid —  $2.45$  another rapid and shoal.

S  $70$  W  $3.17$  lost 5' upon a shoal.

Stoped until  $4.27$  upon a shoal.

N  $50$  W  $5.30$  lost 25' encamped; thermometer at  $8^h$  p.m.  $54^{\circ}$  made this day 16 miles 32 perches.

1804 } Tuesday 13<sup>th</sup> Thermometer in air 33° in river water  
 November } 55° — fog — calm.

Set off at 6<sup>h</sup> 51' per log 8 perches.

Continued

N 50 W 6.55

N 7. 2

E 7.23

N 45 E 7.40

N 45 W 7.44

S 85 W 8.00

S 55 W 8.40 lost 10'. at 8<sup>h</sup> 10' an Island; at  
 8<sup>h</sup> 12' a strong rapid landed to  
 breakfast.

Set off at 9.42 9 computed leagues from the  
 post: an Island on the right rocks  
 called Roque rau.

N 9.46 rate per log 7 perches.

N 45 E 9.53 wind south.

N 45 W 10.31 river 150 yards wide — banks  
 about 25 feet high.

N 11.10 lost 17' on shoals — at 11<sup>h</sup> 3'  
 gravelly rapids and a house on  
 the right. Otter Bayou on the  
 left at the end of the course: an  
 Island at the mouth of the Bayou.

S 70 E 11.30 lost 12' the river has a more spa-  
 cious appearance than below.

N 80 E 11.55 Two settlements at the end of the  
 course on the right called 'Ecor  
 aux Noyers' 30 feet bank, 4 feet  
 clear at high water. Some Cypress  
 grows along the bank.

N 30 E 12.10

N 70 E 12.30 at 12<sup>h</sup> 26° a house on the right.

N 10 E 12<sup>h</sup>36' a shower of rain — landed to dine. { 1804  
 Set off at 3. 3 Thermometer 66°. November

Continued

N 10 E 3.17 rate per log 8 perches.

N 35 E 3.30

N 15 E 3.50

N 40 E 4.00 a 3.54 Bayu Bartelemi 12 computed leagues from the post.

N 55 W 4.11 rate per log 6½ perches.

S 75 W 4.25 lost 8'.

N 45 W 4.27

N 25 E 4.29

N 65 E 4.38

E 4.46

N 30 E 4.51

N 20 W 5.00

N 60 W 5.10 Bayou Pawpa.

N 20 W 5.20 encamped on the right, made this day 16 miles 312 perches. At 8<sup>h</sup> p.m. Thermometer in air 62°.

Wednesday 14<sup>th</sup> Thermometer in air 44° in river water 55° clear, calm.

Set off at 7. 6 rate per log 5¼ perches.

N 20 W 7.24 Bayu Mercier on the left.

N 10 E 7.50 lost 2'.

\*N 10 W 8.12 landed to repair the rudder irons & to breakfast.

Set off 10.24

Continued

\* On our return we landed 37 perches below the end of this course i. e. at 8<sup>h</sup> 8½' on the 15<sup>th</sup> January 1805 and took the Sun's alt: to correct the time of the watch, at 10<sup>h</sup> 56' 24'' a.m. ap: alt: ☽ l.l. 66° 36' 45'' In: er: + 12' 20''.

1804 } N 10 W 10<sup>35</sup>' wind N.W.  
 November } N 40 W 11.19 at 11.3 'Bayu Buttes' (mount  
 ' Creek).

N 11.21

N 65 E 11.25 rate per log 6 perches.

N 11.30

N 70 W 11.40 landed to observe Oap:mer:dbl: alt: 76° 54' 35" In: er: + 13' 47".5. latitude found 32° 50' 8".5.

After dinner

Set off at 1.40

Continued

S 70 W 1.47

N 80 E 2. 3

N 2.13

N 55 W 2.27

N 35 W 2.30 lost 8'; at 3<sup>h</sup> 6' an Island begins, main channel on the left — qr. 3<sup>h</sup> 30' at 3<sup>h</sup> 13' End of the Island and Bayu on the left.

N 10 W 3.40 rate per log 7 perches; low country commences.

N 15 E 3.53

N 35 E 3.59

N 45 W 4. 4 river from 50 to 60 yards wide.

N 75 W 4. 7

N 4.15 small timber; overcup white oak along the banks subject to be overflowed.

N 35 E 4.19

N 4.22

S 70 W 4.26

N 60 W 4.28

N 4.29

N 50 E 4.33'  
 N 20 W 4.35  
 N 45 W 4.39  
 N 45 E 4.42  
 N 45 E 4.44  
 S 85 E 4.50  
 N 15 E 4.53  
 N 60 W 4.55  
 N 80 W 4.58  
 N 40 W 5. 2  
 \*N 40 E 5. 6  
 N 80 E 5.10 Wind west — river 35 to 40 yards wide.

1804  
 { November

N 30 W 5.13  
 N 30 W 5.17 Encamped on the left, made this day 12 miles 303 perches.

Thursday 15<sup>th</sup> Thermometer in air 33° in river water 55° hoar frost — some clouds.

Set off at 9.14

Continued

N 30 W 9.35 rate per log 7½ per :  
 N 10 W 9.42  
 N 40 W 9.50  
 N 10. 3  
 N 50 W 10.10  
 S 70 W 10.24 lost 8'.  
 N 10.53 lost 5' a rapid.  
 N 70 E 11.00 Bank low overflows 20 feet perpendicular.

N 20 E 11. 4  
 N 20 W 11. 7

\* On our return down the Washita, on the 14<sup>th</sup> January 1805 we observed an Eclipse of the moon at this place, from whence the longitude was deduced.

1804

November }

N 45 W 11<sup>h</sup> 23'N 30 E 11.24 No more long moss (Tilansia)  
seen above this.

N 45 E 11.35 at 11<sup>h</sup> 33' 'Isle de Mallet'—  
landed to observe and placed the  
Instrument on the left shore 90  
yards higher than the point of  
the Island: ☽ ap: dble: mer:  
alt: 76° 5' 28" In: er: +13'. 30"  
Latitude found 32° 59' 27".5.  
The division line between the  
Territory of Orleans and that of  
Louisiana will traverse the river  
32½" of a degree north of the  
place of observation, and may be  
found at any time by following  
the above remarks respecting the  
situation of the N.E. end of the  
Island of Mallet.

## Set off after

dinner at 1.28

N 10 W 1.46

N 35 E 1.55

N 25 W 1.58

N 30 W 2.10 rate per log 7 perches.

N 80 W 2.17

N 25 W 2.30

N 2.35  
N 60 W 2.42  
N 10 W 2.51

3 sand beaches ('les trois bat-  
tures').

W 3.13

S 45 W 3.24 Thermometer 60°.

W 3.33 rate per log 8 perches 'Bayu grand  
marais' on the left.

N 45 W 3 <sup>h</sup> 35'	1804
Stop 3.47	
N 3.57	
N 50 W 4. 5	
N 4. 7	
N 60 E 4.12	
N 4.15	
N 40 W 4.34	
N 4.42 Cypriere Chatteleau on the right — a point of high land approaches within half a mile of the river on the same side.	
N 45 W 4.46	
S 80 W 4.56	November
S 75 W 5. 2	
N 45 W 5. 5	
Encamped on the left — Thermometer at 8 <sup>h</sup> p.m. 50° extremes 33°-60° made this day 16 miles 42 perches.	
Friday 16 <sup>th</sup> Thermometer in air 38° in river water 54° — cloudy — calm.	

Set out at 6.58

Continued

N 45 W 7.10 rate per log 7½ perches.
N 10 W 7.16
N 45 W 7.23
N 15 W 7.26 a Creek on the left.
N 5 E 7.35
N 45 W 7.39
— W 7.40
S 70 W 7.43
S 80 W 7.49
N 45 W 7.51
N 45 E 7.54

1804	N	65	E	7 <sup>1</sup> :58'
November }	N	25	E	8. 2
	N	10	W	8.10
	N	45	E	8.22
	N			8.27
Breakfast				9.35
Continued				
	N			9.42 rate per log 7 <sup>1</sup> / <sub>2</sub> perches.
	N	65	E	9.45
	S	60	E	9.50
	N	45	E	9.55
	N			10. 8
	N	20	E	10.18
	N	20	W	10.24
	N	45	W	10.37
	N			10.40
	E			10.53
	N	30	E	10.56
	N	15	W	11.10
	N	50	W	11.19 on the right, 'marais de la Saline'
				— a large lake and point of high
				land about a mile distant — Tulip
				creek on the right.
	N	80	W	12. 2 lost 24'.
	S	70	W	12.22
	N	45	W	12.29
	S	45	W	12.53 Great Saline Bayu on the right.
Dinner				2.34
Cont'd				
	S	45	W	2.39 rate per log 7 <sup>1</sup> / <sub>2</sub> perches.
			W	2.43
	N	20	W	2.45
	N	30	E	2.57
	N	75	W	3. 4

S 80 W 3<sup>b</sup>24'  
 S 25 E 3.34  
 S 60 W 3.39  
     W 3.54  
 N 20 E 4.00  
 N 45 E 4.14  
 N 20 W 4.23 the 3 pine trees.  
 N 55 W 4.46 lost 8'.  
 N      4.50  
     W 4.52  
 S      4.54 encamped: Thermometer at 8<sup>b</sup>  
           p.m. 42° extremes 38° 51° made  
           this day 17 miles 185 perches.

{ 1804  
 November

Saturday 17<sup>th</sup> Thermometer in air 40° in river water  
       54° fog on the river, calm, river  
       rose 2½ inches in the night.

Set off at 7.19

Course continued

S      7.23 rate per log 6 perches.  
 S 75 E 7.27  
 N      7.40  
     W 7.42  
 S 45 W 7.55  
 N 45 W 8.00  
 N 20 E 8. 9  
 N 60 E 8.17  
 N 30 W 8.18  
 N 80 W 8.27  
 N 20 W 8.30  
 N 5 W 8.56  
     W 8.58 'marais de cannes' (cane marsh) on  
           the right.

Breakfast 10. 7

S 15 W 10.23 rate per log 7 perches.

1804 }      S 65 W 10<sup>h</sup> 42' long leaf-pine.  
 November }      N 45 W 10.49 saw the first swan, shot by one of  
                   the hunters.

W 10.52

S 45 W 11. 1 persimmons and small black grapes.

N 45 W 11.18

S 75 W 11.25 small cane — Sun breaks out —  
 serene.

N 55 W 11.30 no long moss (tilandsia) seen since  
 we entered the low alluvial lands.

N        11.42 landed to observe. ⊖ mer : ap :  
 dble : altitude  $74^{\circ} 37' 52''$  In : er :  
 + 13' 57".5 latitude  $33^{\circ} 13' 16''.5$ .

Dinner      1.42

Continued

N        1.49 rate 8 perches.

N 45 E 1.50

E 2. 5

N        2. 9 a rapid.

W 2.21 canes pines.

N 70 W 2.39

N 45 E 2.52 saw an alligator.

N        3.10

N 80 W 3.30 the Eagle.

S 45 E 3.31

S 30 E 3.48 lost 10'.

S 15 W 3.52

S 70 W 3.57

N 80 W 4. 4

N 60 W 4.17

S 80 W 4.19

S 55 W 4.29

N 80 W 4.32

N 30 W 4.35 sand beaches.

N 4<sup>b</sup>47'  
N 70 W 4.53

1804  
November

W 5. 7 Thermometer at 8<sup>b</sup> p.m. 44° extremes 40°-51° made this day 15 miles 308 perches.

Sunday 18<sup>th</sup> Thermometer in air 32° in river water 52° serene — calm, — river rises a little.

Set out at 7.20

Continued

W 7.23 rate per log 7½ perches.  
S 20 W 7.34  
S 80 W 7.49 lost 3' by the rapid, at 7.41 an Island and passage round to the right, the old channel shut up by a sand bar; the whole river runs through the narrow channel of about 70 feet wide.

N 10 E 8. 2  
N 15 W 8. 6  
N 40 W 8.20  
S 80 W 8.23  
S 35 W 8.27  
S 10 W 8.40  
N 80 W 8.48  
S 25 W 8.51  
S 45 E 9. 2  
S 9. 7 'Cache la Tulipe' (Tulipe's hiding place).

Breakfast 10.11

Continued

S 10.22 rate per log 7½ perches.  
W 10.34  
N 20 E 10.40  
N 15 W 10.44

1804 November }	N 40	W 10 <sup>45</sup> 2'
	N 10	W 11. 7
		W 11.13
	S 25	W 11.20 lost 3' by a rapid.
	S 60	W 11.25
	N 80	W 11.30
	N 50	W 11.41 landed to observe, ☽ ap: mer: dble: alt: 74 1' 25" In: er: +13'. 50" latitude found 33° 17' 33".
	Dinner	1.33
	S 75	W 1.46 rate per log 7½ perches.
	N	1.55
	N 30	E 2. 9
	N	2.14 Bay Morau — a large inlet on the right, which swells into a consider- able lake during an inundation.
	N 80	W 2.26
	South	2.43
	S 45	W 2.46 large pine trees.
	S 65	W 2.56
	S 15	W 3.10
	S 50	W 3.27 lost 14'.
	S 75	W 4.19 hill on the left called ('Cote de hachis').
	S 55	W 4.30
	S 85	W 4.32
	N 30	W 4.34
	N	4.39
	N 35	W 4.41
	N 60	W 4.44
	S 30	W 4.52
	S 70	W 4.57
	N 70	W 5.00
	N 40	W 5.02

N 5:05 encamped Thermometer at 8<sup>h</sup> { 1804  
p.m. 57° in air, cloudy. made this { November  
day 18 miles 75 perches.

Monday 19. Thermometer in air 54° in river wa-  
ter 54° cloudy, calm, river at a  
stand.

Set off at 6.56

Continued

N 7.00 rate per log 7½ perches.

N 60 W 7.15

N 35 W 7.18

S 15 W 7.23

S 70 W 7.24

N 70 W 7.26 Bayu de Hachis on the left.

N 30 W 7.31

N 70 W 7.40

N 52 W 7.49

N 7.52 points of high land touch the  
river at various places — the val-  
ley about a league broad on each  
side.

N 70 E 7.58

N 47 E 8.17

N 8.25

W 8.26

S 55 W 8.37

N 80 W 8.40

N 50 W 8.45

N 50 E 8.52

N 30 E 8.53

Breakfast 10. 6

N 30 E 10.15

N 30 W 10.28

S 25 W 10.42

1804 November }		W <sub>10</sub> .44'
	N 58	W <sub>10</sub> .46
	N 15	W <sub>10</sub> .53
	N 40	W <sub>11</sub> .08
		W <sub>11</sub> .10
	S 25	W <sub>11</sub> .26
	S 10	E 11.29
	S 35	E 11.34
	S 50	W <sub>11</sub> .38
		W <sub>11</sub> .48
	N 20	W <sub>11</sub> .53
	N 60	W <sub>11</sub> .58
	N 40	W <sub>12</sub> . 4
	N 80	W <sub>12</sub> . 8
	S 60	W <sub>12</sub> .16
	S 40	W <sub>12</sub> .22
	S 55	W <sub>12</sub> .32
	S 45	W 1. 4 lost 20'.
	N 65	W 1.11
	N	1.30
	Dinner	3.24 cloudy.
	Continued	
	N	3.29
	N 50	W 3.33
		W 3.36
	S 55	W 3.44
	N 70	W 3.45
	N	3.47
	N 55	W 4.00
	N	4. 7
	N 60	W 4.15
	N 20	W 4.20
	N 25	E 4.30
	N 80	W 4.34

S 80 W 4<sup>h</sup>42'  
 N 35 W 4.45 Cabane Champignole.  
 N 60 W 4.52 rain.  
 N 10 W 4.55 encamped, Thermometer at 8<sup>h</sup>  
 p.m. made this day 18 miles 120  
 perches.

{ 1804  
 November

Tuesday 20<sup>th</sup> Thermometer in air 59° in river water  
 54° cloudy, calm.

Set off at 6.48  
 North 6.56 rate per log 7½ perches.  
 West 6.58  
 S 40 W 7. 4  
 S 60 W 7.17  
 N 55 W 7.30  
 N 20 W 7.39 a deep creek on the left called  
 Chemin couvert.  
 N 7.48  
 N 50 W 7.52  
 S 75 W 7.56  
 S 10 W 8. 4  
 S 75 W 8.13 a rapid, and gravel beach, water  
 40 yards wide.  
 N 60 W 8.20  
 N 20 W 8.37 a narrow passage to the left 60  
 feet wide a small narrow Island.  
 N 45 W 8.44  
 N 25 W 8.50  
 N 25 E 9. 4  
 N 30 W 9.20 lost 10'.  
 N 55 W 9.32  
 Breakfast 10.50  
 S 80 W 11. 7 rate per log 7½ perches.  
 N 75 W 11.14  
 N 45 W 11.23

1804 November } S 80 W 11<sup>h</sup>.27'  
 S 35 W 11.29  
 S 28 W 11.39  
 S 58 W 11.48 saw an alligator / they seldom go  
     farther north in this river.  
 S 30 W 11.53 Timber — birch, maple, holly &c.  
 S 75 W 12. 2 cloudy and uncertain, did not go  
     ashore to observe.  
 N 60 W 12. 4  
 N 20 W 12.15  
 N 25 E 12.22  
 S 75 E 12.32  
 N 40 E 12.36  
 N 10 W 12.50  
     W 12.54  
 S .80 W 1. 4  
 Dinner 3.00 Thermometer 62°  
 N 10 E 3.16 ferruginous earth.  
 N 45 W 3.18  
 S 50 W 3.31  
     W 3.36  
 N 3.38  
 N 50 E 3.44  
 N 3.50  
 N 45 W 3.56  
 N 75 W 4.00  
 S 70 W 4.10  
 S 50 W 4.32 lost 7'.  
 S 85 W 5. 3 at 4.54 a hill of pines on the left;  
     at 5<sup>h</sup> an island; we passed through  
     a small channel to the right. made  
     this day 18 miles 308 perches,  
     thermometer at 8<sup>h</sup> p.m. 54° ex-  
     tremes 59°-62°.

Wednesday 21<sup>st</sup> Thermometer in air 43°, in river water 54°, fog, calm. { 1804  
 November

Set off at 7<sup>h</sup> 3'.

Course continued.

S 85 W 7.15 rate per log 7 perches.

N 35 W 7.17 Fin's hill a cliff 100 feet perpendicular.

N 7.44 lost 6' by a rapid.

N 25 W 7.52

N 10 W 7.57

N 25 E 8.19

N 35 W 8.29

W 8.32

S 8.35

S 40 E 8.43

S 55 W 8.53 river 80 to 90 yards wide.

S 85 W 9. 5

Breakfast 10.12 'Cote à Ross' (Ross' hill or camp).

N 10 E 10.20

N 45 W 10.26

S 75 W 10.32

N 45 W 10.35

N 15 W 10.47

N 45 E 10.55

S 45 E 11.11

N 45 W 11.20

N 10 W 11.26

N 35 E 11.34

N 11.46 landed to observe ☽ ap: mer: dble: alt: 72° 14' 48" In: er: + 13'.

51" Latitude found 33° 29' 29".

Dinner 1.30

N 55 W 1.39 rate 7 perches.

1804 }      S 80 W 1.45'  
 November }      N 75 W 1.51  
             N 60 W 1.55  
             N 85 W 1.59  
             S 45 W 2. 2  
             S      2. 4  
             S 40 E 2.12  
             S      2.15  
             S 40 W 2.25  
             N 80 W 2.33  
             S 80 W 2.47 lost 8'.  
             West      2.52 a creek to the left.  
             N 10 W 2.57  
             N 75 W 3.22 lost 7' thermometer 72°.  
             N 15 E 3.33  
             N 55 E 3.35  
             N 80 E 3.46  
             N 45 W 3.51  
             S 82 W 4. 3  
             N 60 W 4. 9  
             N 52 W 4.14  
             N 70 W 4.20 'Pointe-Coupée' (a cut off) old  
                     channel in a continuation with this  
                     course, the boat channel to the  
                     right.  
             N 50 E 4.24  
             N 68 E 4.28  
             N 35 E 4.33  
             N 58 E 4.40  
             N      4.43  
             N 43 W 4.48  
             N 15 W 4.51  
             N 30 E 5.00  
             N      5. 5

N 45 W 5<sup>h</sup> 9' encamped on the right: made 18 { 1804  
miles 36 perches: thermometer at { November  
8 p.m. 58° extremes 43°-72°.

Thursday 22<sup>d</sup> Thermometer in air 40° in river water  
53° light clouds — calm. set off at  
7.6.

S 62 W 7.15 rate per log 6½ perches.

W 7.20

N 53 W 7.36

N 32 E 7.42

N 7.51

N 45 W 7.58

N 20 W 8. 2

N 20 E 8. 9

N 25 W 8.12

N 55 W 8.18

W 8.31

N 45 W 8.33

N 20 W 8.41

N 40 W 8.45

N 8.53

N 45 W 8.58

Breakfast. 10. 7

S 80 W 10.16

N 85 W 10.21

S 70 W 10.25

S 10.33 at 10.28 the Cadaux or Cadodoquis  
path crosses the river leading to  
the Arcansas.

W 10.48 at 10.43 'Ecor à Fabri' (Fabri's  
cliffs) 80 to 100 feet high lead said  
to be buried on the ridge by Fabri  
in the direction of the french and  
spanish line.

1804      }      N 60 W 10.52'  
 November }      N 40 W 10.55  
 N            10.59  
 N 45 E 11. 8 lost 7' — 40 yards wide.  
 S 80 E 10.20  
 N 45 E 11.21  
 N            11.23  
 N 30 W 11.25  
 N 70 W 11.31  
 N 25 W 11.33  
 N            11.36  
 N 65 E 11.41  
 N 20 E 11.43  
 N 10 W 11.45  
 N 45 W 11.56 cloudy, no observation.  
 N 75 W 12. 2  
 S 85 W 12.17 lost 8'. at 12.15 'petit ecor à Fabri' (small cliff of Fabri)  
 N 45 W 12.20  
 N 10 W 12.26  
 N 30 W 12.31  
 Dinner      2.34  
 N            2.37  
 E            2.44  
 S            2.45 a rapid.  
 S 45 E 2.47  
 E            2.50  
 N 40 W 2.58  
 N 15 W 3. 8  
 N 45 W 3.10  
 W 3.13 river 30 yards wide only here, enclosed by bars &c.  
 S 45 W 3.16  
 S 15 E 3.20

S 45 W 3<sup>h</sup>23'  
 W 3.27  
 S 70 W 3.28  
 N 75 W 3.31  
 N 20 W 3.34  
 N 26 E 3.56 lost 9'.  
 N 60 E 4. 6  
 N 20 E 4. 8  
 N 5 W 4.11  
 N 50 W 4.15  
     W 4.18 rapids.  
 S 50 W 4.25 d°  
 N 60 W 4.53 lost 18' strong rapids and shoals.  
 N 10 E 5.00 encamped made this day 14 miles  
     317 perches thermometer at 8  
     p.m. 54 extremes 40° 68°.

{ 1804  
 November

Friday 23<sup>d</sup> Thermometer in air 48° in river water 54°  
     light clouds — calm : river on the  
     fall.

Set off at 7. 4  
 N 15 W 7. 8 rate per log 6 perches.  
     W 7.11  
 N 55 W 7.13  
 N 25 W 7.15  
 N 10 W 7.34 lost 5'. rapids.  
 N 45 E 7.39  
 N 7.43  
 N 60 W 7.47  
     W 7.53  
 S 45 W 8. 2 lost 2'. rapids.  
     W 8. 5  
 N 60 W 8. 8  
 N 20 W 8.26 lost 2' on rapids.  
 N 45 W 8.28 lost 1'.

1804 } S 45 W 8<sup>b</sup>.35'  
 November } Breakfast 9.54 Drunkards Islands.  
 N 45 W 10. 1  
 N 15 E 10. 5  
 N 25 E 10.12  
 N 45 E 10.17  
 N 45 W 10.25 lost 5'.  
 S 10.37 lost 5'.  
 N 45 W 10.54 lost 5'.  
 N 85 W 11. 0  
 N 45 W 11. 5  
 N 10 E 11. 9 'Cote á Sofrion' (Sofrion's hill).  
 N 15 W 11.15 banks from 9 to 12 feet high;  
 yellowish clay.  
 N 65 W 11.20 lost 4'.  
 N 45 W 11.43 Landed to observe ☽ ap : dble:  
 mer : alt  $70^{\circ} 59' 13''$  In: er + 14'  
 8" Latitude found  $33^{\circ} 41' 35''$ .  
 Dinner 1.43  
 N 45 E 1.51 'Pointe-Coupée,' old channel to  
 the east.  
 N 1.54 lost 2'.  
 W 1.56  
 S 70 W 1.58  
 N 45 W 2. 6  
 Lost 2.20 stop to cut willows.  
 N 45 E 2.22  
 N 15 W 2.30  
 N 30 W 2.43  
 N 10 E 2.50  
 N 35 E 2.56  
 N 60 E 3. 7  
 N 3. 9  
 N 45 W 3.12 Thermometer  $72^{\circ}$ .

N 80 W 3 <sup>b</sup> 17'	{ 1804 November
S 75 W 3.24	
S 35 W 3.37 lost 6'.	
S 3.40	
S 45 W 3.45	
W 3.51	
N 50 W 4. 2	
N 50 E 4. 5	
E 4.13	
N 25 E 4.17	
N 4.30 lost 2'.	
N 45 E 4.33	
N 4.38	
N 75 W 4.46 rapids.	
N 20 W 5.00	
N 5. 5 Encamped. Made 13 miles 28 perches thermometer at 8 <sup>b</sup> . p.m. 54°.	

Saturday 24<sup>th</sup> Thermometer in air 48° in river water  
54° light clouds — calm — river at  
a stand.

Set off at 6.56

N 10 W 7. 4 rate per log 6 perches.
S 45 W 7. 8 Iron ore — black sand 'Auges d'Arclon' (Arclon's troughs).
N 25 W 7.36 lost 22'.
N 60 E 7.53 river in general 80 Yards wide.
N 25 E 8. 3
N 70 E 8. 6
S 50 E 8.22 lost 3' — rocky bottom — strong rapid.
N 40 E 8.30
N 8.39
Breakfast 9.49

1804 } N 35 W 10<sup>h</sup> 0'  
 November } N 10. 3  
 N 40 E 10.56 lost 30' long and strong rapids.  
 N 70 E 11.20 lost 18' ditto.  
 E 11.27  
 S 45 E 11.30  
 S 15 E 11.39 lost 2'.  
 S 45 E 11.48 lost 3'. a deserted corn patch.  
 N 15 E 12. 8 cloudy, no observation.  
 N 41 W 12.18 osiers or hoop willows.  
 N 65 W 12.25  
 W 12.34 Bayu Tallien on the left.  
 N 60 W 1. 0 lost 5' on a rapid.  
 N 55 W 1.14 Forks of the Washita and Little-  
 Missouri, the latter coming in from  
 the left in the direction of the last  
 course.

Dinner 3.10  
 N 20 W 3.20  
 N 30 E 3.25 lost 3'.  
 N 33 lost 5'.  
 N 40 W 3.37  
 N 60 W 3.41 lost 3'.  
 N 45 W 3.46 lost 2'.  
 N 20 W 3.51 lost 4' Petit-Washita on the left,  
 runs into the Little Missouri.  
 N 70 E 3.58 lost 1'.  
 N 45 E 4.18 lost 9'.  
 E 4.22 'Belle ance.'  
 N 35 E 4.25  
 N 30 W 4.47 lost 15'.  
 N 25 E 4.54  
 N 60 E 4.56  
 S 85 E 5. 7 lost 5'.

N 60 E 5<sup>h</sup> 13' encamped — thermometer at 8<sup>h</sup> { 1804  
p.m. 59°. November

made 11 miles 152 perches.

Sunday 25<sup>th</sup> confined all day to camp by the bad state of the weather, raining great part of the day. Extremes of the thermometer 54° to 70° and at 8<sup>h</sup> p.m. 62°.

Monday 26<sup>th</sup> Thermometer in air 50° in river water 57° — clear — calm — river risen 3½ inches during the night.

Set off at 7. 7

N 40 E 7.52 lost 30' rate per log 6½ perches.

N 8. 5 white maple.

N 45 W 8.13 lost 2'.

N 20 W 8.25 Bear's head camp.

N 60 W 8.30

N 80 W 8.38 cane land.

S 35 W 8.42

S 75 W 8.47

W 8.58 lost 2'.

N 30 W 9.11

N 35 E 9.15

Breakfast 10. 8

E 10.15 lost 8'.\*

N 10.20

W 10.24

N 40 W 10.39 lost 6'.

N 10.50

N 80 E 10.53 lost 1'.

N 11.03

N 45 W 11.24 lost 2' — 'Petite-Cote' — an Island.

N 11.27

N 22 E 11.33

1804 } N 73 E 11° 41'  
 November } N 35 E 11.46  
 N 85 E 11.50 landed to observe —  $\odot$  ap: mer:  
 dble: alt:  $69^{\circ} 23' 52''$  In: er:  
 +  $13' 38''$  Latitude found  $33^{\circ}$   
 54' 6".5.

Dinner 1.47

Continued

N 85 E 1.50

N 38 E 1.57 lost 4'.

N 20 E 2. 3

N 85 W 2.15

N 70 W 2.20

N 45 W 2.29 many Islands.

N 25 W 2.52 lost 16'.

N 70 E 3. 0

N 25 W 3.15 lost 9'.

N 65 W 3.28

N 50 W 3.33 at 3.31 'Bayu de Cypre' on the  
left. birch and osier.

N 3.40

E 3.46 lost 5'.

N 30 E 3.15 lost 4'.

N 55 E 4.40 lost 38'. cut away some logs.

N 20 W 4.47

N 75 W 4.52

S 65 W 4.55

S 5. 1 Encamped — Thermometer at 8  
p.m.  $62^{\circ}$  — extremes  $50^{\circ}$ — $68^{\circ}$  made  
12 miles 21 perches.

Tuesday 27<sup>th</sup> Thermometer in air  $54^{\circ}$  — in river water  
 $58^{\circ}$  — cloudy — river risen above  
 a foot.

Set off at 7. 1

S 80 W 7<sup>1</sup>11' rate per log 6 $\frac{1}{2}$  perches.

N 70 W 7.17

N 45 W 7.21

N 10 W 7.33

N 20 E 7.38 rapids commence.

N 80 E 7.46 lost 6'.

N 40 E 7.55

N 30 W 8. 0

N 70 W 8. 9 lost 7' Piraugue à Gallien.

S 70 W 8.15 lost 3' left the rapids.

N 50 W 8.20

N 8.33

N 30 W 8.48

Breakfast 9.51 river rises 1 $\frac{1}{2}$  inch during the hour.

W 9.55

S 30 W10.10

W10.13

N 45 W10.17

N 10 W10.30

N 45 W10.32

S 70 W10.36

S 30 W10.40 lost 2'.

N 70 W10.48

N 40 W10.52

N 10.54

N 45 E 11.12

N 25 E 11.29 lost 8' a large Island to the left.

N 40 E 11.30

N 11.35

N 45 E 11.42

N 25 E 11.46

N 11.52 cloudy — no observation.

N 36 W12.04 at 12<sup>h</sup> 'Cache à Maçon' and bayu

{ 1804  
November

1804  
November }

on the right: about  $1\frac{1}{2}$  mile  
N.N.W. explored the banks of  
a creek in search of a coal mine  
and found only some fragments  
of carbonated wood; river risen  
4 inches in 2 hours.

Dinner       $2^{\text{h}} 15'$   
 N 60 W 3. 0 rate per log  $6\frac{1}{2}$  perches.  
     W 3.25 lost 17'.  
 N 45 W 3.34  
 N      3.40  
 N 45 W 4. 0 lost 6' river 150 yards wide.  
 N 70 W 4. 9  
     W 4.23 lost 7'.  
 N 70 W 4.32 lost 6'.  
 N 45 W 4.49  
 N 85 W 4.52  
 N 70 W 5. 0 encamped thermometer @  $8^{\text{h}}$  p:m.  
     66° extremes  $54^{\circ}$  -  $71^{\circ}$  made this  
     day 13 miles 39 perches.

Wednesday 28<sup>th</sup> Thermometer in air  $68^{\circ}$  — in river  
 water  $60^{\circ}$  — river fallen 4 inches in  
 the night — cloudy — calm.

Set off at      7. 5  
 S 65 W 7.13 rate per log  $6\frac{1}{2}$  perches.  
 S 80 W 7.22  
 S 65 W 7.29 'Ecor aux poux de bois.'  
 N 60 W 7.37  
 N      7.42  
 N 35 E 8.16 lost 22'.  
 N 50 E 8.30  
 N 30 E 8.39  
     8.54 lost 10'.  
 N      8.57

Breakfast 10<sup>h</sup> 3' beautiful pine woods on the right. { 1804  
 N 10.32 lost 14' — Bayu de l'eau froide on { November  
 the right, no cypress to be seen  
 about this creek on the margin of  
 the river.

W10.36

S 45 W10.42 lost 3'.  
 N 75 W10.46  
 N 45 W10.49  
 N 11.11 lost 11'.  
 N 40 W11.15 lost 2'.  
 N 11.25 lost 5'.  
 N 75 W11.30  
 S 70 W11.46 lost 7'.  
 S 40 W11.58  
 N 75 W12. 2 cloudy no observation.  
 N 45 W12. 7  
 N 25 W12.20  
 N 40 W12.30  
 N 25 W12.57 lost 3'.

Dinner 3. 9  
 S 70 W 3.22 lost 4'.  
 N 70 W 3.25  
 N 40 W 3.42 lost 5'.  
 N 80 W 3.44  
 S 45 W 3.54 lost 3'.  
 W 4. 1

N 40 W 4.21 lost 7 — at 4.7 Grand glaise (Big  
 salt lick) on the left 2 miles dis-  
 tant Bayu de Cypre opposite in  
 the interior.

N 4.25  
 N 45 E 4.28  
 N 55 E 4.31

1804 }      E 4.34'—river 170 yds wide.  
 November }      S 75 E 4.44

            E 4.54

            N 45 E 4.58

            N 10 E 5. 4

            N 20 W 5. 8 Encamped. made 12 miles 255  
 perches. thermometer at 8<sup>h</sup> p.m.  
 73°—extremes 68°—78°.

Thursday 29<sup>th</sup> Thermometer in air 72° in river water  
 62°—cloudy—wind south—  
 rain; remained in camp untill after  
 dinner.

Got off at 1.27

            N 85 W 1.34 rate per log 7 perches Saline Bayu;  
 about half a league north a salt  
 spring.

            N 65 W 1.58 lost 5'.

            N 35 W 2.12

            N 70 W 2.25

            N 40 W 2.37

            N 5 W 2.50

            N 45 W 3.18 lost 11'. at 3<sup>h</sup> 'Ecor à chicots.'

            N 3 3.33 lost 3'.

            N 80 E 3.45

            S 60 E 3.46

            S 30 E 3.57

            S 45 E 4. 2 rapids.

            S 85 E 4. 8

            N 70 E 4.18 lost 3'.

            N 30 E 4.22 lost 2'.

            N 60 W 4.31 lost 6' rapids.

            N 30 E 4.37

            N 40 E 4.42

            N 70 E 4.49

N 5<sup>h</sup> o' Encamped made 8 miles 2 perches. { 1804  
 thermometer at 8<sup>h</sup> p.m. 52° ex- { November  
 tremes 52°-76°.

Friday 30<sup>th</sup> Thermometer in air 38° in river wat: 60°  
 — clear — calm — river risen 19  
 inches since last evening.

Set off at 7. 7

N 7.22 rate per log 6 perches.

N 80 W 7.25

S 45 W 7.30

S 30 W 7.46 lost 10' rapids.

S 60 W 7.49

N 75 W 7.53 lost 2'.

N 55 W 8.19 lost 6'.

N 15 W 8.26 lost 3'.

Breakfast 9.45

N 10 W 10.18 lost 6'.

N 10.27 'Fourche des Cadaux' on the left  
 100 yards wide — a hill 300 feet  
 high.

N 20 E 10.32

S 85 E 10.40

N 70 E 11. 5 lost 6'.

N 40 W 11.45 lost 21'. landed to observe, ⊙ Ap:  
 mer: dble: alt: 67° 25' 30" In:  
 er: + 13' 42" latitude found 34°  
 11' 37"—

Dinner 2. 0

N 15 E 2.15

N 50 E 2.18 'Bayu de Roches' on the left  
 (rocky Creek).

E 2.34

N 65 E 2.40

N 35 E 2.44 Encamped — Thermometer at 3<sup>h</sup>:

1804 } November } 57° went to visit a saline. made  
7 miles 28 perches.

December 1<sup>st</sup>

Saturday Thermometer in air 32° — river water 54°  
— clear — calm — river fallen 18  
inches during the night.

Set off at 7<sup>h</sup> 5' ' Isle de roches ' (rocky island) 3/4  
mile long on the right.

N 35 E 7.23 lost 10' — rate per log 6 perches.  
N 75 E 7.31 lost 5'.  
S 70 E 7.42 lost 6'.  
N 65 E 7.52  
N 45 E 8. 0  
N 32 E 8.10  
N 15 E 8.34 lost 13'.

Breakfast 10.12

N 55 E 10.18  
S 80 E 11.10 lost 20'.  
N 15 E 11.25 lost 11'.  
N 10 W 12. 5 lost 35' on the rapids: no obser-  
vation.

N 45 E 12.15 ' Bayu de l'isle de Mellon ' on  
the right.

E 12.27

Dinner 2.29  
E 2.44

S 45 E 2.53 lost 4'.

N 45 E 2.56

N 3.36 lost 11' at 3<sup>h</sup> 30' a saline distant  
2 miles to the left, and Isle de  
mellon on the right.

N 10 W 4.37 lost 38' encamped — made 7 miles  
148 perches — Thermometer at 8<sup>h</sup>  
p.m. 35° extremes 32°-58°.

Sunday 2<sup>d</sup>. Thermometer in air 30° in river water 50° { 1804  
clear — calm — river fallen 4 inch. { December

Set off at 7<sup>h</sup>35'

N 10 W 7.44 rate per log 3 perches rapids com-  
mence.

N 45 E 7.50  
N 75 E 7.55  
S 30 E 8. 4  
S 80 E 8.13  
N 40 E 8.29  
S 80 E 8.32  
N 55 E 8.37  
N 42 E 8.40 rapids end.

Breakfast 10.7

N 42 E 10.35 rate per log 5 perches.  
N 28 E 10.51  
N 15 E 10.58  
N 8 W 11. 0  
N 12 W 11.12  
N 10 W 11.43 lost 15' rate per log 3 perches.  
N 20 E 11.46 rate per log 5 perches.

Dinner 2. 3

N 20 E 2.30 at 2<sup>h</sup>19' slate quarry on the left and  
a Creek.

N 55 E 2.23 'Isle de Chevreuil' (Deer island).  
N 40 E 2.39 lost 3' — Free stone and blue slate  
to the left.

N 5 W 3.11 strong rapids rate per log 3 perch-  
es — Bayu de prairie de Cham-  
pignole on the left.

N 32 E 3.28 Thermometer 59° —

N 45 E 3.46

S 85 E 3.51 lost 11', rate per log 5½ perches.

N 53 E 4. 7 Encamped: — made 6 miles 118

1804

December }

perches—Thermometer at 8<sup>h</sup> p.m.  
38° extremes 30°-59°.Monday 3<sup>d</sup> Thermometer in air 38° in river water 48°  
—clear—calm—river fallen 8  
inches.

set off at 7:12'

N 35 W 7.20 rate per log 5 perches.

N 20 W 7.31

N 10 E 8. 4 lost 8'.

N 30 W 8.26 'Bayu de l'eau froide' on the left.

N 30 E 8.45 lost 3'.

breakfast 9.50

S 70 E 10. 8 rapid; rate 3 perches:

N 75 E 10.20

N 10.40

N 10 E 11. 4 lost 18'. rate per log 6 perches.

S 15 E 11.28 rapids 3 perches per log.

E 11.40 rate per log 5 perches, landed to  
observe ☽ ap: mer: dble alt: 66°  
12' 00" In: er: + 13' 48".5 lati-  
tude found 34° 21' 25".5.

Dinner 1.45

N 35 E 2. 6 rate per log 3 perches.

N 2.15 rate per log 5 perches.

N 25 E 2.42 lost 22'.

N 60 E 2.48 rate per log 3 perches.

N 40 E 2.53

N 10 W 3. 8 lost 5' rate per log 5 perches.

N 20 E 3.13

E 3.28 lost 13'.

N 45 E 3.32

N 80 E 3.35 rate per log 3 perches.

N 45 E 3.45 rate per log 4 perches.

N 4 1 at 3.57 rock promontory, hard

flint, on the right with masses in  $\begin{cases} 1804 \\ \text{December} \end{cases}$   
the river.

N 30 W 4<sup>h</sup> 18<sup>m</sup> arrived at the 'Chuttes' passed  
over and encamped.  
river 200 yards wide.  
made 7 miles 218 perches—  
Thermometer at 8<sup>h</sup> p.m. 44° ex-  
tremes 38°—59°.

Tuesday 4<sup>th</sup> Thermometer in air 36° in river water  
48° clear—calm—river fallen 2  
inches.

set off at 7.21

N 45 W 7.34 rate per log 4 perches.

N 25 W 8.15 at 8<sup>h</sup> passed a ledge of hard free  
stone rocks—rocky bottom, high  
rocky hill in front covered by pines  
a fine situation 350 feet high.

N 60 W 8.25

W 8.33

Breakfast 9.59

W 10. 9 rate per log 2 perches.

N 45 W 10.12 rate per log 4 perches.

N 20 W 10.15

N 20 E 10.24 at 10.20 bald hill on the left—ar-  
rive at the rapids.

N 50 E

$\frac{1}{2}$  mile: a very violent rapid.  
landed to observe  $\odot$  ap: mer:  
dble alt: 65° 47' 4" In: er: +  
13' 44" latitude found 34° 25'  
48".

Dinner 1.45 rocky pine hill 300 feet high on  
the right.

N 20 W 1.52 rate 5 perches.

N 60 W 1.55

1804 } N 85 W 2<sup>h</sup> 3' rate per log 6 perches: hills of blue  
December } slate (or shistus) to the left.

S 80 W 2.17

N 40 W 72 perches — violent rapid, long  
detention.

S 80 W 112 perches — encamped — 'Bayu  
de la Saline' on the right, made  
4 miles 164 perches — Thermome-  
ter at 8<sup>h</sup> p.m. 36° extremes 36° -  
50°.

Wednesday 5<sup>th</sup> Thermometer in air 23° in river  
water 47° — serene — calm — river  
fallen 2 inches.

Set off at 7.25

S 70 W 8. 2 lost 25' — rocky hills on both sides  
— rate per log 5 perches.

S 55 W 30 perches — a violent rapid or  
cascade 4½ feet fall in 80 yards.

Breakfast 10.57

S 70 W 11.15 rate per log 6 perches.

W 11.20

N 50 W 11.29

N 40 W 144 perches, a strong rapid. —  
rocky hills on the right — high  
freshes 25 feet perpendicular above  
the present level of the river, at  
the end of this reach on the right  
a creek, called 'Fourche a Tigre'  
(Tiger Creek) good land upon this  
Creek.

Set off at 1.45

S 80 W 1.55 rate per log 4 perches.

Dinner 3.50

W 3.55

N 70 W 4<sup>h</sup>23' rate per log 3 perches.

N 45 W  $\frac{1}{4}$  mile.

1804  
December

Set off at 4.54

N 45 W 4.59 rate per log 3 perches.

S 45 W 5. 1 Encamped made only 3 miles  
128 perches. Thermometer at 8<sup>h</sup>  
p.m. 38° extremes 23°-56°

Thursday 6<sup>th</sup> Thermometer in air 45° in river water  
48° cloudy — wind S.W. light —  
river fallen 2 inches.

Set off at 7.40

S 45 W 7.52 rate 4 perches.

S 30 W 8. 7 hills to the left, good land to the  
right.

S 55 W 8.20 lost 4'.

N 80 W 8.37 lost 12'.

N 30 W 8.52 lost 2'.

Breakfast

N 20 W  $\frac{1}{2}$  a Mile: a great rapid, very pre-  
cipitous: 3 hours in getting over.

Set off at 1. 8

S 75 W 1.16 rate per log 5 perches, arrived at  
Ellis' camp a little below the  
'Fourche a Calfat', encamped  
made 2 miles and 32 perches,  
thermometer at 8<sup>h</sup> p.m. 56° ex-  
tremes 45°-67°.

S 25 W the course up the river, Calfat's  
mouth  $\frac{1}{2}$  a mile upon the left.

### AT ELLIS CAMP.

Friday 7<sup>th</sup> Thermometer in air 38° in river water 47°  
cloudy, wind N.W. river risen 4

1804  
December }

inches. Took the Suns ap : mer :  
dble alt:  $64^{\circ} 59' 47''$  In : er : +  
 $14' 5''$ . latitude found  $34^{\circ} 27' 31''$   
Thermometer at 3<sup>h</sup> p.m.  $50^{\circ}$  at 8<sup>h</sup>  
p.m.  $24^{\circ}$

Saturday 8<sup>th</sup> At Ellis' Camp. Thermometer before  
sunrise  $10^{\circ}$ — river water  $43^{\circ}$ —  
very serene— light wind N.W.  
river risen 4 inches. Took the  
Sun's meridian ap : dble alt  $64^{\circ}$   
 $46' 58''$  In : er : +  $14' 19''$  latitude  
found  $34^{\circ} 27' 27''$  being a differ-  
ence of  $4''$  from the result of yes-  
terday : if we should not make any  
more observations here for the lati-  
tude it may be considered as fixed  
at  $34^{\circ} 27' 29''$ . Thermometer at 3<sup>h</sup>  
p.m.  $47^{\circ}$  at 8<sup>h</sup>  $26^{\circ}$

### HOT SPRINGS.

Having determined to ascertain the latitude and longitude of this place with all due care and attention, the following series of observations was instituted for the latitude, using alternately the face of the Circle of reflection to the east and to the west, and reading off the angle from the three arms of the Index ; but finding the Index error lyable to change daily, I found it preferable to calculate each days latitude independently by itself, to that of taking the means of several days altitudes, more especially as we were approaching the Solstice ; but I have preserved the results of the same face of the Instrument as one series, and taken the mean of the two series for the true Latitude.

## Face of the Circle to the East.

$$\left\{ \begin{array}{l} 1804 \\ \text{December} \end{array} \right.$$

Dec. 15 <sup>th</sup> : Ap : mer : dble alt : ☉ lower limb.	1 <sup>st</sup> Index 63-35'- 0'' In : er : +15'-48''	Latitude
	2 <sup>d</sup> Do 63-34-30 . . .	<u>16-13</u>
	Means 63-34-45 . . .	<u>16-0.5</u> 34°30'-56.''8
	3 <sup>d</sup> Index under the handle could not apply the Microscope.	
17 <sup>th</sup> . . . .	1 <sup>st</sup> Index 63-25-10 . . .	15-48
	2 <sup>d</sup> Do 63-24-40 . . .	<u>16-13</u>
	Means 63-24-55 . . .	<u>16-0.5</u> 34-30-58. 2
25 <sup>th</sup> . . . .	1 <sup>st</sup> Index 63-23-50 . . .	15-26.6
	2 <sup>d</sup> Do 20 . . . .	<u>15-51.6</u>
	Means 63-23-35 . . .	<u>15-39.1</u> 34-30-58.75
27 . . . .	1 <sup>st</sup> Index 63-34-50 . . .	13-33.6
	2 <sup>d</sup> Do 20 . . . .	<u>14-3.6</u>
	Means 63-34-35 . . .	<u>13-48.6</u> 34-30-54
	Mean Latitude of the above	
	34-30-56.94	

## Face of the Circle to the West.

16 <sup>th</sup> Ap : mer : dble alt : ☉ lower limb	1 <sup>st</sup> Index 64° 1'-20'' In : er : -16'-11.2''	
	2 <sup>d</sup> Do 37	42.2
	3 <sup>d</sup> Do 20	12.2
	Means 64- 1-26 . . .	<u>16-21.9</u> -34°31'- 4
24 <sup>th</sup> . . . .	1 <sup>st</sup> Index 63-51-50 . . .	15-41.4
	2 <sup>d</sup> Do 52-20 . . . .	<u>16-13.4</u>
	3 <sup>d</sup> Do 51-50 . . . .	<u>15-48.4</u>
	Means 63-52-0 . . . .	<u>15-54.4</u> -34-31- 0
26 <sup>th</sup> . . . .	1 <sup>st</sup> Index 63-58-30 . . .	15-28.5
	2 <sup>d</sup> Do 59-00 . . . .	<u>15-48.5</u>
	3 <sup>d</sup> Do 58-32 . . . .	<u>15-28.5</u>
	Means 63-58-41 . . . .	<u>15-35.2</u> -34-31- 4. 2
	Mean Lat. from ye 2 <sup>d</sup> series	
	. . . . .	
	34-31- 2.75	
	Mean Do from ye 1 <sup>st</sup> do	
	. . . . .	
	34-30-56.94	
	Cabin at the hot springs true Latitude	
	. . . . .	
	34-30-59.82	

Note the Index error was every day taken from a double contact of the Sun with his image immediately after the observation: When the error was additive

1804 } it was found by subtracting the ⊖ diameter from the  
 December } greater contact and when subtractive the lesser con-  
 tact was subtracted from the diameter, but in prac-  
 tice the greater or lesser contact was added to the  
 ap : dble alt : to save trouble, as explained in the  
 beginning.

Courses taken from the hill west of the hot springs  
 on the 13<sup>th</sup> of December 1804 with computed dis-  
 tances.

1<sup>st</sup> Station.

N 54 E  $\frac{1}{2}$  mile to the Cabin.

S 61 E 6 miles to the river Camp.

S 36 E 6 d<sup>o</sup> to the mouth of Hot spring fork.

S 18 E 6 do to the mouth of Luke fork (west  
 side of the river Washita.

S 10 W 9 do . . . to . . . do of Mont-cerne (west  
 side) —

S 16 $\frac{1}{2}$  W 11 do to the top of Mont-cerne.

S 76 W 1 $\frac{1}{2}$  mile to the Source of the Hot  
 spring creek.

S 76 E 3 miles to a hill in the fork of Calfat  
 creek.

N 32 E Course of the ridge looking back.

S 60 W to 2<sup>d</sup> station being about a mile in a di-  
 rect line making a Cord to the  
 arched form of the ridge. — Courses  
 from 2<sup>d</sup> Station.

S 11 W to Mount-Cerne.

N 64 W to the passage of the river between the  
 hills about 12 miles distant.

S 3 W to the mouth of Bayu-Mont-cerne :  $\frac{1}{2}$   
 mile S.E. a great rapid or Cascade  
 below the mouth of Bayu Mont  
 cerne.

S 48° E to the mouth of Hot-spring creek.      1804  
 S 72° E to the River Camp.      December  
 N      50 miles, ridge of hills of the Arcansa.  
 S.E.      50 miles a level of great extent, supposed  
             to be the prairies of the Red-  
             river.

Sunday 16 Took the Sun's magnetic azimuth before and after noon with the same altitude.

A.m. at 9<sup>h</sup> 50'-19" ⊙ lower limb dble alt: 47° 30'.

p.m. time missed	mag : az : S 42° 20' E
	d°      S 25° 40' W
	difference      16-40
	Var. E $\frac{1}{2}$ dif-8-20

Correction for change of declination. + .7"  
 Equal altitudes ⊙ ap: dble alt: 54° 27' In: er: +  
 15' 46".

Contact upper limb at 10 <sup>h</sup> 18'-59"	}
Center      21-56	
lower limb      24-59	}
lower limb at 1-42-12	
Center      1-45-15	}
upper limb      1-48-12	

A.M.

P.M.

Took the following distances of the ☽'s east limb from α Arietis.

	Times				Distances				Times				Distances				Times				Distances			
At	10h	31'	50"	55°	38'	20"		10h	39'	11"	55°	41'	20"		10h	47'	12"	55°	44'	50"				
	10	33	57	55	39	10		10	41	53	55	42	40		10	50	12	55	45	55				
	10	36	46	55	40	10		10	44	49	55	43	45		10	53	48	55	47	20				

Index error  
— 16' 16"

The above may be commodiously divided into 3 Sets or otherwise at the pleasure of the calculator.

1804 } December } Monday 17<sup>th</sup>

## Equal Altitudes

○ ap : dble alt : 45° 49'.	○ " In : err : + 15' 48"	Magnetic az: S 44° 30' E with the Sun's lower limb A.M.
Upper limb at 9° 44' .56" $\frac{1}{2}$		
Center 9 .47 .13		A.M.
Lower limb 9 .49 .30		
Lower limb 2 .27 .57 $\frac{1}{2}$		P.M.
Center 2 .30 .13		
Upper limb 2 .32 .31		

These equal altitudes together with those of the preceeding day will correct the watch and ascertain her rate of going, from which the apparent times of the Lunar distances will be precisely known.

Sunday 23

## Equal Altitudes

○ ap : dble alt: 43° 42' 25" In : err : + 15' 27".

Upper limb at 10° 8' 2"	A.M. Watch supposed to have gained 45'.
Center 10.10.13	
Lower limb 10.12.25	

The contacts P.M. lost by the intervention of clouds.

Altitudes of the Sun's lower limb with Magnet: azim :

At 10° 24' 12" Alt: 46° 31' 5" Azim: S 43° E.

10.28.57 47.35.40 S 42 E.

Ind : err : + 15.27.

Monday 24<sup>th</sup>

## Equal Altitudes

○ ap : dble alt : 43° 32' 47" Ind : err : + 15' 41" 6

Upper limb at 10° 12' 33 $\frac{1}{2}$ "	A. M.
Center 10 14 43	
Lower limb 10 16 55	

Clouds intervened in the afternoon

Wednesday 26<sup>th</sup>

Set the watch back one hour to correspond nearly with the present time, no alteration being made in minutes & seconds.

## Equal Altitudes

$\odot$  ap : dble alt:  $32^\circ 43' .25''$  Ind:err:  $+15' 27''$  } 1804  
 Upper limb at  $8^\circ 40' .5 \frac{1}{2}''$  } December  
 Center  $8^\circ 41' .56 \frac{1}{2}''$  } A.M.  
 Lower limb  $8^\circ 43' .45''$

Clouds intervened in the afternoon.

The last observations having been made when the Sun was barely clear of the vapor of the hot springs, I give the preference to the following observation made for the Correction of the Chronometer & for ascertaining the magnetic variation.

At  $9^\circ 6' 50''$  ap : dble alt:  $\odot$  lowr. limb  $39^\circ 16' 40''$   
 Magnet: azim: S  $49^\circ$  E Ind:err:  $+15'.27''$ .

## Lunar observations

on the astronomical 25<sup>th</sup> Decem: took the following distances of the  $\odot$  and  $\odot$ 's limbs

Times	Distances	Dble alt $\odot$ lowr. limb by Dor. Hunter
At $22^\circ 5' .29''$	$58^\circ 14' .0''$	In : er : $-15' 27''$
22. 8 . 5	58. 13 . 0	
22.11 . 10	58. 12 . 0	53 <sup>o</sup> 57' .30'' Ind:err: $-1' 22'' .5$
22.19 . 0	58. 10 . 0	55.27 . 10
22.22 . 5	58. 9 . 0	
22.25 . 0	58. 8 . 0	
22.39 . 7	58. 4 . 0	
22.42 . 0	58. 3 . 0	
22.44 . 35	58. 2 . 0	59.12 . 10
22.48 . 40	58. 1 . 0	59.43 . 15
22.54 . 37	57.59 . 0	60.25 . 20
22.57 . 47	57.58 . 0	60.46 . 20

## Survey of the hot-spring Hill.

1<sup>st</sup> Station or place of Commencement on the west bank of the Creek opposite to the first or highest mass of Calcareous matter; Courses taken at this Station: N  $40^\circ$  E up the Valley adjoining the hot-spring hill; and N  $15^\circ$  W the course of the Creek upwards: Thence

1804      }      S 20° E 18 perches to the bank of the Creek on  
December      }      the same side.

At 8 per: opposite to the middle of the Natural hot-bed over the Creek, a small hot-spring at its commencement. At 14 per: a hot-spring N° 3 opposite side of the Creek.

S 25 W 14 per: to the hot-spring N° 4 six feet to the left in the side of the bank of the Creek. At 2 per: hot-spring N° 1 opposite side of the Creek: at 12 per: hot-spring N° 2. over the Creek distant 4 perches.

S 3 E 34 per: nearly parallel to the Creek.

At 7 per: the Center of the Cabin on the right hand, and spring N° 5 in the gravel over the Creek: at 20 per: several small springs over the Creek: at 22 per: the lowest hot-spring N° 6.— All the forgoing Courses have been nearly parallel to the Creek, the continuation of which is S 13° E.

S 42 E 20 per: immediately cross the Creek, and at 4 per: the lowest calcareous mass.

N 60 E 106 per: At 60 per: the valley on the right distant 20 per:

S 66 E 30 per: to the Valley base of the hill: at 20 p. yellowish schistus.

N 60 E 60 per: N.E. corner of the base of the hill.

N 23 E 174 per:— 60 per: to the left the ridge is parallel to the Course.

N 16 E 70 per: to a rocky ridge perpendicular to the course and precipice looking

down into a branch of the Cafat running to the right; the Creek above winds into the direction of the last course, the ridge to the left divides the Calfat from the hot-spring Creek.

1804

December

N 44° W 30 per

S 84° W 72 per: to the top of a high ridge very narrow, connected with the hot-spring hill.

S 45° W 60 per: descending the Valley: The top of the hill west of the Camp is in the direction of the course: at right angles on the left at the end of the course  $\frac{1}{4}$  mile distant is a gap or low place in the ridge contiguous to the hot-spring hill.

S 31° W 80 per: down the valley — veins of the flinty rock nearly in the direction of the course and fissures at right angles: Flint and hard siliceous stone above, Schistus at the base — and from thence to the place of beginning nearly in the course of the Valley.

Courses and distances from Hot-spring Camp to the river Camp, commencing at the Cabin — Thence

S 15° E 788 per: — to the 1<sup>st</sup> Knoll 122 p. — to the 1<sup>st</sup> branch 162 p. to the 2<sup>nd</sup> branch 282 p. — to 3<sup>rd</sup> d<sup>o</sup> 322 p. — to 4<sup>th</sup> d<sup>o</sup> 502 p. — to crossing of hot-spring creek 614 per: and at the end of the course a branch.

N 80° E 70 per: to the top of a ridge.

1804 }     S 69 E 184 per: to the 2<sup>d</sup> branch.  
 December }     S 25 E 160 per:  
             S 68 E 80 p. to the Big lick.  
             N 55 E 200 p. to the 2<sup>d</sup> lick — at 160 p. 3<sup>d</sup>  
             branch.  
             N 82 E 534 p. to the 5<sup>th</sup> branch — at 168 p. the  
             4<sup>th</sup> branch.  
             S 84 E 122 p. to the main Calfat — at 56 p. cross  
             the last branch. the course of the  
             Calfat is S 38° E.  
             S 74 E 178 p. to the 3<sup>d</sup> lick.  
             S 54 E 304 p. to the river Camp. — at 94 p. a  
             — branch.

1805 }     2620 perches, equal to 8 miles 60 perches.  
 January } Saturday 5<sup>th</sup> At Ellis' Camp.

## Equal Altitudes.

ap : dble Alt : 43° 18' 30".

Upper limb at	9 <sup>h</sup> 43' 10"	A.M. Ind: err:
Center	9. 45. 12	
Lower limb	9. 47. 19	+ 13' 15".
Lower limb at	2. 59. 22	
Center	3. 1. 27	P.M. Ind: err:
Upper limb	3. 3. 33	

As the same instrument was to be used for various purposes on the same day, the Index set for equal altitudes could not be screwed up until the afternoon observation, and as the Index error was liable to change in the course of the day particularly when used much in the sun-shine, it is accordingly noted in the last example; the slight error it might occasion, would not materially affect the result.

Took the following alt: and azim: to ascertain the magnetic variation:

At 10<sup>h</sup> 3' 42" a.m. ☽ ap : dble alt : low<sup>l</sup> limb

47° 21' 10" Magnet: Azim : S 46° Ind : err : + 13' 15".

{ 1805  
January

At noon the ap: dble alt: ☽ low: limb was 65°  
8' 40" Ind: err: + 13' 9".

Lat: deduced 34° 27' 28".8 which is within 0".2  
of the mean of the former two observations.

Distances taken between the ☽ and ☽ limbs

At 2<sup>h</sup> 22' 45" Distance 54° 1' 0" Ind: err: + 13' 5"

2. 25. 50 . . . 54. 2. 0

2. 28. 45 . . . 54. 3. 0

Distances taken of the ☽ 's west limb from Alde-  
baran

At 7<sup>h</sup> 1'. 56" Distance 84° 52'. 0" In: er: + 13' 5" Alt: dble ☽ 's low: limb  
64° 17' 30"

7. 4. 0 84. 51. 0 In: er: — 1. 20  
7. 6. 6 84. 50. 0 by Dr. Hunter

January 14<sup>th</sup> Monday. At a point which we passed  
in ascending Nov: 14<sup>th</sup> — N 40° E 5<sup>h</sup> 6'. observed  
an Eclipse of the Moon.

At 12<sup>h</sup> 40' p: watch. Beginning of the Eclipse —  
uncertain.

13.37 Beginning of total darkness  
— good observation.

Took the following altitudes of the Sun to correct  
the Chronometer and ascertain the apparent time of  
the Eclipse.

15<sup>th</sup> Tuesday

At a point on the river bank which corresponds  
to the Courses and distances of our voyage upwards  
viz Nov: 14<sup>th</sup> N 10° W 8<sup>h</sup> 8 $\frac{1}{2}$ '; took the Sun's alt.  
viz at 10<sup>h</sup> 56' 24". ap: dble alt low: limb 66° 36' 45"  
Ind: err: + 12' 20".

Thursday 17<sup>th</sup>

At the Post of Washita, the same station where

1805 } we observed on our way up, Took the Sun's altitude  
January } viz :

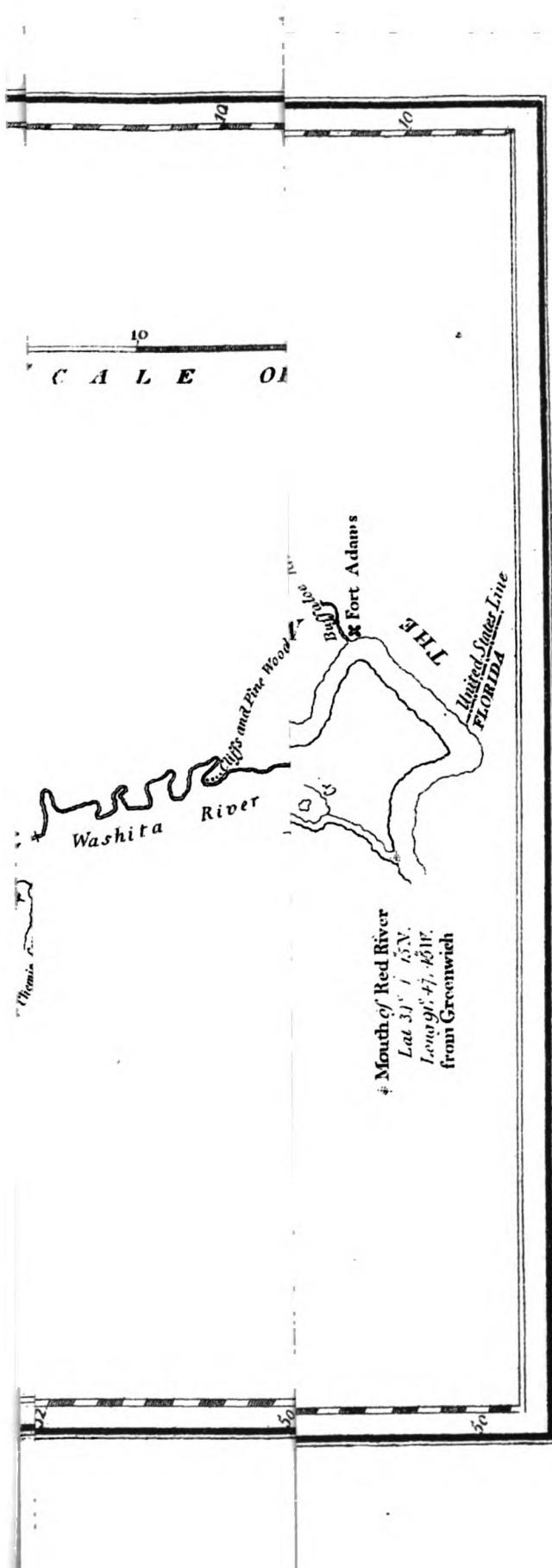
At 8<sup>h</sup> 53' 7" ap : dble alt : ☉ low. limb  $36^{\circ} 44' 45''$   
In : er : + 12' 30".

From the above observations the apparent time of  
the Eclipse may be found & the whole refered to the  
Meridian of the Post of the Washita.



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